# REDD+: the forest grabs of all times?

## Final workshop proceedings of project

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# FINAL WORKSHOP PROCEEDINGS
# OF PROJECT
# REDD+: THE FOREST GRABS OF ALL TIMES?

**Organizer: Vietnam National University of Agriculture (VNUA)**
**Location: ATS Hotel, 33B Pham Ngu Lao, Hoan Kiem, Hanoi**
**Date: 15-16 November, 2017**

## INTRODUCTION TO THE PROJECT

### REDD$^+$: The Forest Grabs of all times?
### Development Research Project: DFC No.13-08KU

**Global issues**: Although REDD$^+$ (Reduced Emissions from Deforestation and Forest Degradation) operates with social safeguards there is a risk that local communities will lose access and rights to forests, especially because of the frequent existence of competing legal and customary rights of different stakeholders to the same forest. Furthermore, inequalities within communities may be heightened as some people manage to take advantage of new opportunities while others lose out.

DANIDA support and commitments: DANIDA has policy to combat fighting poverty through promotion of human right and economics growth. DANIDA/DFC has long-term support for research and development for VNUA and Indonesia since 1990's.

**Project type**: Theme 3 - Right to Natural Resources.

**Project coordinator:** Dr. Ida Theilade, Institute of Food and Resource Economics.

**Partner institutions:** Institute of Food and Resource Economics (University of Copenhagen), Roskilde University, Vietnam National University of Agriculture, Institute of Cultural Studies. Agricultural University of Bogor.

**Project objectives**: To investigate how REDD$^+$ influences regulations and access to forest resources, the way compensation for foregone benefits is awarded, and to what degree local monitoring of carbon stocks and livelihood impacts of REDD$^+$ can be used as a tool to empower local communities and help secure their rights in the face of REDD$^+$.

**Distinguish characteristics** that make project different from other projects:

(i) Integrated scientists from both natural and social fields to fulfill the requirement of project on REDD$^+$. Vietnamese and Indonesian researchers collaborate with the experts at Copenhagen University, Roskilde University, and University of East Anglia.

(ii) This project focuses on PhD education that integrated into current PhD programs at Vietnamese and Indonesia. 6 Ph.D students will become key researchers and they will have great contribution to Vietnam and Indonesia in term of REDD implementation in the future.

(iii) This project has very high rate of scientific of publication and findings. More than 15 papers have been published and more than 10 potential international papers will be boing to publish.

(iv) Case studies showed that local communities in both countries can do monitoring carbon stocks and biodiversity with training. There is urgent need government/official guideline for farmer's application to do monitoring.

(v) Local awareness on REDD benefits is still limited. It is causes of delaying in REDD implementation process in the case studies in Vietnam and Indonesia.

(vi) Case studies demonstrated that equitability and transparency in environmental services are still limited. So Multi-challenges for REDD implementation are not only in Vietnam, Indonesia, but also in the global scale.

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**SUMMARY WORKSHOP ON**
**"REDD$^{+}$: The Forest Grabs of all times?"**

On the project frame: *"REDD$^{+}$: The forest grabs of all times?",* Project managerment board, Faculty of Environment, Vietnam National University of Agriculture (VNUA) organized final workshop to disseminate research outcomes and lesson learts for REDD implementation in Vietnam and Indonesia. Workshop event was in Hanoi and Ha Long city from 15 to 18 November 2017. Workshop participants were Ms. Katja Goodhew, the Danish consuler on food, growth develoment, 03 researchers from Copenhagen, 02 from Roskilde university, 01 researcher from University of East Anglia, 8 researchers from Bogor university, Indonesia, 01 from Institute for cultural studies, a representative of International Collaboration Development, MARD, 15 lecturers from Faculty of Environment, VNUA. After openning speeches given by Professor Tran Duc Vien, the chairman of university council and Ms. Katja Goodhew, the Danish consuler on food, growth develoment, partcipants actively presented research findings and discussion. The research results reveal that Vietnam and Indonesia government have a great effort and accieved remarked results from REDD implementation. However, local people's awareness on REDD are still limited that lead to slowdown REDD program.


**Picture 1: International participants in the final workshop on REDD in Hanoi 15-18 November 2017**

## TÓM TẮT HỘI THẢO TỔNG KẾT DỰ ÁN

## "Giảm thiểu phát thải khí nhà kính từ mất rừng và suy thoái rừng (REDD+): Những nỗ lực duy trì và phát triển rừng"

Trong khuôn khổ dự án*: "Giảm thiểu phát thải khí nhà kính từ mất rừng và suy thoái rừng (REDD$^+$): Những nỗ lực duy trì và phát triển rừng",* Ban quản lý dự án, Khoa Môi trường, Học viện Nông nghiệp Việt Nam tiến hành tổ chức Hội thảo Tổng kết dự án với mục đích chia sẻ kinh nghiệm cũng như kết quả thực hiện dự án vào ngày 15-18/11/2017 tại Hà Nội và thành phố Hạ Long. Các đại biểu tham gia hội thảo gồm tham tán đại sứ quán Đan Mạch về tăng trưởng và an ninh lương thực, 03 nhà nghiên cứu, Đại học Copenhagen, 02 nhà nghiên cứu, Đại học Roskilde, Đan Mạch, 01 nghiên cứu viên người Anh, 8 đại biểu đến từ Indonexia, 01 đại biểu đến từ viện nghiên cứu văn hóa, đại diện của vụ hợp tác song phương Bộ Nông nghiệp và phát triển nông thôn, 15 giảng viên Khoa Môi trường, Học viện Nông nghiệp Việt Nam. Sau bài phát biểu khai mạc của GS.TS. Trần Đức Viên và bà Katja Goodhew tham tán đại sứ quán Đan mạch, các đại biểu đã trình bày các kết quả nghiên cứu về REDD tại Việt Nam và Indonesia. Kết quả nghiên cứu cho thấy chính phủ Việt Nam và Indonesia đã có nhiều nỗ lực và đạt được nhiều kết quả khả quan trong thực hiện chương trình REDD. Tuy nhiên nhận thức của người dân còn hạn chế là yếu tố chính dẫn đến REDD thực hiện chưa được như kỳ vọng.

**WORKSHOP PROGRAM**
**REDD$^{+}$: THE FOREST GRABS OF ALL TIMES?**

**Organizer: Vietnam National University of Agriculture (VNUA)**
**Location: ATS Hotel, 33B Pham Ngu Lao, Hoan Kiem, Hanoi**

**Day 1: 15$^{th}$ November 2017**

**Part 1: Overview on the project results (Internal meeting)**

| Time | Content | Responsibility |
|---|---|---|
| 8.30-9.00 AM | Participant registration | |
| 9.00-9.05 AM | Welcome speech | Dr.Tran Duc Vien<br>Chair, University council of VNUA |
| 9.05-9.10 | Speech from the Royal Denmark Embassy | Katja Goodhew,<br>Counsellor on Green Growth, Environment & Food, Embassy of Denmark |
| 9.10-9.20 AM | Introduction of workshop program | Dr.Ida Theilade, project coordinator |
| **Section 1: Project reports** | | |
| 9.20-9.40 AM | IPB report on project activities | Dr.Iskandar Z. Siregar, IPB |
| 9.40-10.00 AM | ICS report on project activities | Dr.Hoang Cam, The Institute of Cultural Studies |
| 10.00-10.30 AM | Coffee break | |
| 10.30-10.50 AM | VNUA report on project activities | Dr. Nguyen Thanh Lam, VNUA |
| 10.50-11.10 AM | IFRO report on project activities | Dr.Ida Theilade , Institute of Food and Natural Resource Economics |
| 11.10-12.00 AM | General discussions | Dr. Henrik and Ida Theilade |
| 12.00-13.30 | Lunch | All participants |
| **Section 2: Ph.D Student's works and presentations** | | |
| 13.30-14.00 | Ph.D Student 1: Progress report & Key findings<br>Questions and Discussions | Cao Truong Son |

| | | |
|---|---|---|
| 14.00-14.30 | Ph.D Student 2: Progress report & Key findings<br>Questions and Discussions | Nguyen Hai Nui |
| 14.30-15.00 | Ph.D Student 3: Progress report & Key findings<br>Questions and Discussions | Adisti P Putri, IPB |
| 15.00-15.30 | Coffee Break | |
| 15.30-16.00 | Ph.D Student 4: Progress report & Key findings<br>Questions and Discussions | Yanto Rochmayanto, IPB |
| 16.00-16.30 | Ph.D Student 5: Progress report & Key findings<br>Questions and Discussions | Dyah I Mardiyaningsih, IPB |
| 16.30-17.00 | Conclusions and remark | Dr.Henrik & Iskandar, Dr.Nguyen Thanh Lam |

**Day 2: 16th November 2017**

**Part 2: REDD's implementation in Vietnam and Indonesia**

| Time | Content | Responsibility |
|---|---|---|
| 8.00-8.30 AM | Participant registration | Ms.Dung & Ms.Huong |
| 8.30-8.37 AM | Welcome speech | Prof.Dr. Tran Duc Vien<br>Chair, VNUA council |
| 8.37-8.44 AM | Welcome from the project coordinator | Dr.Ida,<br>Project coordinator |
| 8.44-8.50 AM | Welcome from MARD | Tran Diem Lan, ICD, MARD |
| **Section 3: REDD$^+$ Governance and Policy**<br>Chair: Dr. Thorkil and Dr. Ole | | |
| 8.50-9.10 AM | Meso-Level Negotiations: A missing link in understanding the interplay between REDD$^+$ and wider forest governance in Vietnam? | Catherine Locke, Roger Few and Hoang Cam<br>*University of East Anglia* |
| 9.10-9.30 AM | Multi-level challenges for REDD$^+$ implementation in Vietnam | Thorkil Casse<br>*Roskilde University* |
| 9.30-9.50 AM | Is REDD$^+$ compatible with Vietnam's development policies for the highlands? | Ole Bruun<br>*Roskilde University* |
| 9.50-10.10 | General discussions | Dr. Thorkil and Dr. Ole |
| 10.10-10.40 | Coffee break | |

| | | |
|---|---|---|
| **Section 4: Farmer's response to REDD$^+$**<br>Chair: Dr. Ole Bruun & Dr. Hoang Cam | | |
| 10.40-11.00 AM | Can PES and REDD$^+$ match Willingness To Accept payments in contracts for reforestation and avoided forest degradation? The case of farmers in upland Bac Kan, Vietnam | Martin Nielsen<br>*University of Copenhagen* |
| 11.00-11.20 AM | **Case study from Berau, East Kalimantan, Indonesia:**<br>Can REDD$^+$ Work on the Existing Forest Property Rights: Lessons from Forest Management Unit and Village Forest in Berau, East Kalimantan Province, Indonesia. | Yanto Rochmayanto & Dodik R Nurrochmat<br>*IPB, Indonesia* |
| 11.20-11.40 AM | Fairness and Transparences in Payment for Forest Ecosystem Services programs in Vietnam: A Community Based Evaluation | Mr.Cao Truong Son<br>VNUA |
| 12.00-13.30 | Lunch + Photo-Voice | All participants<br>Institute of Cultural Studies |
| **Section 5: Does REDD+ and forest plantation programs enhance local livelihood?**<br>Chair: Dr.Iskandar & Dr.Martin | | |
| 13.30-13.50 | Livelihood Development of Forest Dependent Households within a REDD$^+$ Implementation Area in Bac Kan Province, Vietnam | Mr.Nguyen Hai Nui<br>VNUA |
| 13.50-14.10 | Case study from Berau, East Kalimantan, Indonesia:<br>From Hunting-gathering to Industrial Economy: Analysis of Livelihoods Change of Punan Dayak Communities in East Kalimantan, Indonesia | Dyah I Mardiyaningsih & Arya H Dharmawan<br>*IPB, Indonesia* |
| 14.10-14.30 | The Role of Community Forest for Rural Livelihoods: The Case of *Merabu* Village | Dr.Arya,<br>*IPB, Indonesia* |
| 14.30-14.50 | General discussion | Chair: Iskandar & Dr.Martin |
| 14.50-15.20 | Coffee break | |
| **Section 6: Does community monitoring capture forest biodiversity**<br>Chair: Drs. Henrik and Ida Theilade | | |
| 15.20-15.40 | Community monitoring of biodiversity in Vietnam and Indonesia. | Henrik Meilby<br>*University of Copenhagen* |

| | | |
|---|---|---|
| 15.40-16.00 | Alternative approaches for Community biodiversity monitoring: A case study in Ba Be National Park | Dr Xuyen<br>*Vietnam National University of Hanoi* |
| 16.00-16.20 | Can parataxonomists improve biodiversity surveys? A case from Indonesia | Deden Girmansyah Herbarium Bogoriense<br>*IPB, Indonesia* |
| 16.20-16.40 | Case study from Berau, East Kalimantan, Indonesia: Agroforest diversity and ethnobotanical aspects in two villages of Berau, East Kalimantan, Indonesia | Adisti P Putri & Iskandar Z Siregar<br>*IPB, Indonesia* |
| 16.40-17.00 | Conclusions and closing remark | Henrik & Iskandar, Dr.Tran Duc Vien |

## WELCOME SPEECH

**Prof.Dr. Tran Duc Vien**
*Chair, University Council,*
*Vietnam National University of Agriculture*

Your Excellency,

Distinguished Guests

Dear Ms.Katja Goodhew, counsellor on Green Growth, Environment & Food, Embassy of Denmark

Ms.Tran Diem Lan, Vice-Head, ICD, International collaboration department, MARD

Dr.Ida Theilade, project coordinator

Dear participants and colleagues:

On behalf of Vietnam National University of Agriculture, I would like to welcome you all to participate in the final Workshop on REDD$^+$: the forest grabs of all times. The objective of this workshop aims to demonstrate our research results on REDD$^+$: safeguard issues and PhD works related to the project.

In this workshop, we will demonstrate interesting results that combining social and natural scientists from different countries such as Denmark, United Kingdom, Indonesia and Vietnam. Our PhD students will have opportunity to present their key finding. The research results reveals that REDD implementation still has multi-challenges as well as equitability and transparency in environmental services are still limited in Vietnam and Indonesia. Case studies showed that local communities in both countries can do monitoring carbon stocks and biodiversity with training. There is urgent need government/official guideline for farmer's application to do monitoring.

I hope that the workshop results will help policy makers, local authorities, NGOs, Vietnam National University of Agriculture, and relevant institutions to recognize the importance of REDD$^+$ implementation issues and its management in Vietnam and Indonesia. The works that we have done today will contribute a great effort to protect our environment and saving our future.

In this great event, I would like to take this opportunity to thanks all of you for your participations, especially partners of this project: Institute of Food and Resource Economics (University of Copenhagen), Roskilde University, Agricultural University of Bogor, Vietnam National University of Agriculture, Institute of Cultural Studies, University of East Anglia. I would like also to extend my sincere thanks to DANIDA supports to our university for more than 20 years, and their support today for this workshop event. Thanks to Danish research institutions to collaborate with us for our

capacity building and sharing experiences. Thanks to Faculty of Environment for organizing the workshop.

Given the above importance of REDD implementation issues, I would like to open the workshop ceremony.

Finally, I wish you all, distinguished guests, participants present here today happiness, good health and great success in your works and our safety forest.

Thank you for your kind attention!

## SPEECH FROM THE ROYAL DENMARK EMBASSY

**Ms. Katja Goodhew**
*Counsellor on Green Growth, Environment & Food, Embassy of Denmark*

Your Excellency,

Distinguished Guests and friends,

Ms.Tran Diem Lan, Vice-Head, ICD, International collaboration department, MARD

Dr.Ida Theilade, project coordinator

Dear participants and colleagues:

I would like to thank the workshop organizer, particularly Dr. Tran Duc Vien, Chair of VNUA council and Dr.Ida Theilade, the project coordinator for inviting me here today. On behalf of Royal Danish Embassy, I would like to thank you all to participate in the final Workshop on $REDD^{+}$: the forest grabs of all times. Danish government has commitment to cope with climate change and we would like to work with you to conserve out planet from climate change negative impact. I am happy that Danish research institutions become leading roles in this research development project for capacity building and sharing experiences with Vietnam and Indonesia.

We are here to day for discussing on $REDD^{+}$ implementation issues and its management in Vietnam and Indonesia, which will help policy makers, local authorities, NGOs, Vietnam National University of Agriculture, and relevant institutions to recognize the importance of climate change mitigation.

Finally, I wish you all, distinguished guests, participants happiness, good health.

Thank you for your attention!

## INTRODUCTION OF WORKSHOP PROGRAM

**Dr.Ida Theilade**
*Project coordinator*
*Institute of Food and Natural Resource Economics*

Ladies and Gentlemen,

Professor Dr. Tran Duc Vien, Chairman of the University Council, VNUA

Counsellor of the Royal Danish Embassy Mrs Katja Goodhew,

Dr Lam,

Professors and PhD students,

I am very delighted to see you all here today.

It is now 5 years ago that we formed this partnership and applied for a FFU larger and strategic research grant. At the beginning we did not know each other that well. But the group turned out to be very vibrant and the individual researchers each contributed to get our proposal together under the usual time pressure. From Vietnam, Professor Tran Duc Vien and Dr. Lam was at the steering wheel leading us safely through University regulations and budgeting formats.

Likewise, Dr Cam took charge at the Institute of Cultural Studies allowing a partnership with one of Vietnam's independent research centers. Furthermore, he brought in new partners from the UEA.

In Indonesia, Professor Iskandar worked tirelessly and into the small hours to get the IPB on-board. Professor Iskandar secured the backing of his Department and also got us a very strong backing from the Indonesian Ambassador to Denmark, HE Professor Pasaribu Bomer, a former IPB alumni.

From the UEA, Professor Thomas Sikor joined us enriching us with his work on Environmental Justice. We are very sorry that Thomas is not here with us today due to his illness. However, we are happy that Catherine Locke and Roger Few took up Thomas' work on the project and we are extremely happy that Catherine has joined the workshop. Thank you Catherine and welcome to the group.

I was given the task to Introduce the objectives of the workshop and the program.

As this is the fourth year of the project and it is drawing to a close, the Objectives of the workshop are to:

i) discuss how to finalise common scientific papers and synthesize our findings in a Proceedings;

ii) support the PhD students to wrap up and submit their thesis work;

iii) identify avenues for continued collaboration and options for future funding applications;

iv) evaluate the project: what went well and what could we have done better?;

v) last but not least: enjoy each other's company, re-tell the many stories from the field, re-live the obstacles, the misunderstandings, the confusion, budget worries, institutional challenges, bureaucratic formalities, and logistic nightmares. But also the many achievements, laughs, the creativity and the discoveries, the amazing hospitality of partners and villagers, the determination of our PhD students, the extra efforts put by all supervisors and senior staff, and the backing of our institutions whenever we suggested changes and new directions.

So, how are we going to achieve all of this in 4 short days?

Well, Professor Vien and Dr Lam have made a brilliant program for us. They have provided the framework for us to achieve all the above. Now it's up to us to fill it in. We will have to include late afternoons, maybe evenings, and even nights. But after all, -we are pretty used to that.

For the program:

Today, each institution will give a report on the status of their project activities, so we are all up to speed.

After lunch, the real engines of this project - our Fabulous Five, the PhD students: Dyah, Adisti, Yanto, Nui and Son, will present their key findings and progress.

PhD student Søren has already handed in his thesis, which he will defend in January, Nerea and Hao will submit their theses shortly. Hence, Søren, Nerea and Hao could not join the workshop but they send their best regards to all.

Tomorrow Day 2 –VNUA will host a National REDD$^+$ workshop where specific research findings will be presented and the wider implications of results discussed. There will be sections on all three main themes of the project:

Governance and policies including environmental justice

Monitoring of social safeguards (livelihoods and farmers response to REDD$^+$)

Monitoring of Biodiversity safeguards

Day 3 and 4 – are the real "working days". Here we will supervise PhDs and work on the synthesis and proceedings from the workshop as well as discuss ways forward.

We are most fortunate to be invited by our hosts to visit Halong Bay for the two last days, giving the whole group a chance to see one of the amazing natural wonders of Vietnam.

Before we open the workshop with the first presentations, I would like to extend my sincere thanks to Prof Vien and Dr Lam for inviting us all to VNUA and Hanoi for this final project workshop. I think we should give the organizers a very big hand.

Thank you and wishing all participants a pleasant and productive workshop.

## SECTION 1

## PROGRESS REPORTS FROM PROJECT PARTNERS

SUMMARY

*This part presents progress reports from each partners participate in the project "REDD+: the forest grabs of all times?", the works have been done so far and propose to complete the working packages and PhD works in Vietnam, Indonesia.*

# IPB REPORT ON PROJECT ACTIVITIES

**Professor Iskandar Z. Siregar**
*Country coordinator, IPB, Indonesia*

RESEARCH WORKPACKAGE:

1. Forest Rights (by Yanto Rochmayanto)
2. Livelihood (by Dyah Ita Mardiyaningsih)
3. Community Monitoring (by Adisti Permatasari Putri Hartoyo)

## 1. PROGRESS STUDY OF FOREST RIGHT WORKPACKAGE

### A. Abstract

**Determining Suitable Property Rights of Forest on REDD+ Framework: Lesson from Berau District, East Kalimantan Province, Indonesia**

**By: Yanto Rochmayanto**
*Supervised by: Dodik Ridho Nurrochmat, Bramasto Nugroho, Dudung Darusman, and Thorkil Casse*

Clear forest property rights that are able to control deforestation is a necessary condition for succesfull $REDD^+$ implementation in Indonesia. Deforestation is highly related to or as a consequency of unsecure forest property rights. Ironically, the efforts to reduce deforestation and its relation to $REDD^+$ readiness in Indonesia through property rights arrangement approaches are missing. Therefore, the study aims to: (1) examine forest property rights setting within the national legislation and it's impact on deforestion, (2) identify the influencing factors of forest rights enforcement in local forest managements/institutions in relation to deforestation reduction, adn (3) assess effectiveness of existing forest property rights in local forest managements/institutions on $REDD^+$ framework.

The research was conducted at Berau District, East Kalimantan Province, Indonesia, focused on two local forest institutions, namely: Forest Management Unit (FMU) of Berau Barat, and Merabu Village Forest. Further inquiry was conducted in three villages (Long Duhung, Merapun, and Merabu). Data were collected by survey-based approach, through indepth interviews to key informants in district and site levels, as well as household survey in three selected villages. Historical deforestation was calculated by spatial analysis using satellite imageries. Temporal land cover data was used from 2000, 2006, 2009, 2012, and 2015. Data analysis used both qualitative and quantitative methods.

The study delivers three main conclusions followed by possibly recommendations. Firstly, Indonesia's national legal framework has not been worked to

control deforestation properly. There are two sources of insufficience, namely the content of statutory laws, and contested rules at local level. Secondly, the study confirms that property rights link to deforestation mediated by a complex interaction among three influencing factors (law and regulation, institutional setting, economic preference). The interaction resulting particular forest performance. Contesting rule between formal and informal is possible to provide forest sustainability. Economics preference plays an important role on how property rights work to control deforestation. Thirdly, constelation of forest rights on Merabu Village Forest is effective to achieve contextual outcome for REDD$^+$ framework. The same forest property rights regime showed the different capacity in supporting REDD$^+$ framework, depend on management type. Type of forest management institution plays an important role to determine their capacity to control additionality, leakage, and permanence. Forest property rights at local forest institution in devolution model is more effective for REDD$^+$ framework rather than decentralized model.

These findings suggest some policy recommendations: (1) the need of policy improvements to deal with the ambiguous, contradict, and irrelevant regulations to meet various local rules on forest, (2) propose a priority strategy to deal with deforestation through devolutive programme and economic approach for rural livelihood, (3) scaling-down of FMU area is important, and (4) priority of REDD$^+$ implementation is in devolutive forest institution. The study also contributes to theoretical and practical significance: provide a new concept concerning influencing factors of property rights in sustaining forest, and provide a standard for conceptual and practical inquiry on REDD+ (or any other land-based environmental service schemes) to deal with forest rigths issue on the ground.

***Key words***: *property rights, deforestation, REDD$^+$, Forest Management Unit, Village Forest*

## B. Project Activities

- Taking course in IPB on September 2014 – August 2015 in IPB
- Taking courses in University of Copenhagen, Roskilde University, Denmark on September 2015 – February 2016 with the subjects were 1) Rural Livelihoods and Natural Resources Governance, 2) Writer Development, 3) Research Design
- Written qualification exam, 2 June 2016
- Data collection in Berau, 7-30 August 2016 consisted of:
  1) Preliminary survey (26$^{th}$ – 30$^{th}$ of September 2014)
  2) Inception survey (27$^{th}$ – 31$^{st}$ of July 2015)
  3) Households survey and observation (7$^{th}$–31$^{st}$ of August 2016).

- Oral qualification exam, September 2016
- As a presenter in IUFRO International and Multiciplinary Scientific conference, 4-7 October 2016
- Colloquium, 10 February 2017
- IPB internal seminar, 28 August 2017
- Proceeding of IUFRO International and Multiciplinary Scientific Conference (Scopus indexed, in press) with the title "*Can REDD$^+$ work on the existing forest property right? lessons from forest management unit and village forest in Berau, East Kalimantan Province, Indonesia*"
- Manuscript on Forest Policy and Economics Journal (under-review) with the title "*Can property rights save the forest? managing the linkage between property rights and deforestation in Berau, Indonesia*".

**C. Remaining Activities:**

- Dissertation defense will be held on 12 March 2018
- Manuscript with the title "*Making the law work: contestation and forest rights in Berau District, Indonesia"*. Targeted journal: Land Use Policy
- PhD promotion.

2. PROGRESS STUDY OF LIVELIHOOD WORKPACKAGE

**A. Abstract**

**Livelihood System, Rural Ecology, and Moral Economic Changes of the Punan Dayak Community, in Berau District, East Kalimantan Province, Indonesia**

**By: Dyah Ita Mardiyaningsih**
*Supervised by: Dr. Ir. Arya Hadi Dharmawan, M.Sc. Agr;*
*Dr. Ir. Lala M Kolopaking, MS*
*Prof. Dr. Muhammad Firdaus, SP, M.Si;*
*Dr. Martin Reinhardt Nielsen*

The economic, political, social and ecological system of the Dayak Punan community as an entity is undergoing transformation towards modernity driven by influences originating from development programs, large-scale economic expansion and community empowerment. One source of community empowerment is *Non-Government Organizations* (NGOs), such as the SIGAP REDD+ program, infusing modernity into forest areas across Indonesia. SIGAP REDD+ among other objectives aims to reduce forest dependence by providing communities alternative livelihood options. Along with other developments the SIGAP REDD+ program makes it increasingly difficult for communities to access forest resources they have hiert herto

depended on (e.g. prohibition on expanding fields in forest areas and hunting) and hence makes the Dayak Punan livelihood system vulnerable. Therefore, this study aims to: 1) examine the changing relationship between Punan Dayak communities and the forest as a livelihoods source and determine what livelihood strategies are used in substitution; 2) evaluate the satisfaction of Punan Dayak households with the level of five capitals owned as a measure of sustainability of their livelihood system; and 3) describe the change in Punan Dayak household livelihoods based on a community typology.

This research uses a *post-positivism* paradigm and a mixed method research strategy. Qualitative methods used include in-depth interviews with key informants, direct observation while living in the communities, and a literature review. Quantitative methods used include: a questionnaire survey based on the Poverty Environment Network (PEN). Analysis was conducted at two levels. The Meso and the Micro level. The Meso level took the community as the unit of analysis. Four Dayak Punan communities were selected, namely: Birang village (mining and logging area); Long Duhung village (logging and NGO facilitated REDD+ program area); Merabu village (NGO REDD+ program area); and Merapun village (oil palm plantation area). The Micro level was the household level and included 115 households interviewed in 2015 and 131 households in 2016. Data collection was conducted over the period from 2014 to 2016.

The transformation of Dayak Punan communities livelihood systems is reflected in a changing relationship between people and the forest during the past ten years (2006-2016). Birang and Long Duhung communities still rely on forest to provide a high proportion of income (more than 50%). However, forest now contributes considerable less to household income Merabu and Merapun (less than 30%). In Merabu eco-tourism development facilitated by NGOs through the SIGAP REDD+ program places forest as a source of indirect income.

The four Dayak Punan communities were grouped using a typology of increasing modernity based on interactions between people and the forest, orientation of production strategies, technology and environmental services used. Birang community is placed in the first group as they still depend highly on forest to meet primarily subsistence needs. Long Duhung community is placed in the second group (transitional), as dependence on forest is reduced and to some extent has been replaced by other livelihood strategies fulfilling both subsistence and income generating needs. Merabu and Merapun are both placed in the third group as these communities no longer dependent on forest and primarily rely on commercial production strategies. Increasing community modernity from typology I to III, encourages reliance on non-forest resource dependent livelihood strategies and income from wages and business tends to be

dominant. In other words, the level of dependence on external markets has increased to an extent that households has become vulnerable to fluctuations in world market prices.

The results indicate that rural communities are not a singular but diverse entities. Hence, the implementation of development policies and community empowerment programs needs to be specified to different locations and cultural systems. Furthermore, with increasing modernity efforts are needed to improve the resilience of subsistence systems in rural communities through development of local institutions capable of ensuring household food security. This includes enhancing indigenous communities ability to defend their rights of access to their natural resources. Indigenous communities also need to be educated about the the possible consequences of the expansion of large-scale economic activities such as logging and mining on their land that tend to degrade the quality of their environment.

***Key words:*** *livelihoods transformation, typology of modernity, Dayak Punan Communities, livelihood resilience, forest as source of income*

## B. Project Activities

- Taking courses in IPB on 2014-2015
- Taking course in University of Copenhagen on September 2015 – February 2016 with the subjects were:
    1. Rural Livelihoods and Natural Resources Governance
    2. Globalization and its Discontent
- Written examination, 13-14 April 2016
- Oral examination, May 2016
- As a presenter in Human Ecology Conference, Faculty of Human Ecology, Bogor Agricultural University "Human Ecology towards SDGs", 2 August 2016 with the title was "*Environmental Services as an Alternative Livelihood Strategy in Rural Indonesia: Analysis Livelihood Transformation in Merabu Village, East Kalimantan".*
- Data collection in Kampung Birang, Kampung Long Duhung, Merabu and Merapun on 3-30 August 2016
- Colloquium, 27 September 2016
- As a poster presenter in IUFRO International and Multi-disciplinary Scientific Conference with the title "*Forest-related policy and governance: Analyses in the environmental social sciences*"
- Abstract submitted and manuscript presentation in the International Conference on Research for Development (ICRD), Bern, September 2017 with the title was

*"From Hunting-gathering to Industrial Economy: Analysis of Livelihoods Change of Punan Dayak Communities in East Kalimantan, Indonesia"*

- IPB internal seminar, 1 February 2018.

**C. Remaining Activities**

- Dissertation defense
- Next publication
- PhD promotion

3. PROGRESS STUDY OF BIODIVERSITY WORKPACKAGE

**A. Abstract**

**Biodiversity and carbon stocks monitoring in various agroforestry practices based on participatory approach**

**By: Adisti Permatasari Putri Hartoyo**
*Supervisors: Supriyanto, Lilik B. Prasetyo, Iskandar Z. Siregar, Ida Theilade*

The increasing loss of Indonesian primary forests has significant implications for climate change mitigation and biodiversity loss. REDD+ is a global instrument proposed to address the issues. In Indonesia, however, an assessment is still required for the REDD+ implementation, particularly to address the locally specific conditions. REDD+ aims to reduce emissions from deforestation and forest degradation, conservation, enhancement of forest carbon stocks, and sustainable forest management (SFM) through considering socio-economic, and ecological aspects. A way of accommodating these aspects is through agroforestry since its close link with local knowledge and community participation.

The potential of REDD+ implementations in Berau District, East Kalimantan, Indonesia is high, but it still need to be observed carefully due to the on going threats of degradation and deforestation. There are still challenges to be addressed with respect to local capacity and the use of technology for enhancing the community participation. In Berau agroforestry, fundamental knowledge on plant identification including local name and tree inventory are still incomplete leading to difficulties in estimating the biodiversity status. On the other hand, identification of forest land cover can be done quickly, cheaply, and periodically by remote sensing technology such as FCD (Forest Canopy Density). FCD mapping model can be useful tool for identifying forest status due to its full consideration on vegetation, thermal, shadow, and bare soil indices. However, application of FCD mapping model in agroforestry is limited for supporting biodiversity monitoring. The specific objectives of this research were: i) to characterize agroforest diversity at village level and their associated functions such as habitat function (i.e. plant species richness), regulation function (i.e. soil fertility), production

function (i.e. timber and non-timber), information function (i.e. ethnobotanical uses), ii) to develop the correlation between biodiversity and carbon stock status in agroforestry practices, iii) and to develop the correlation between tree stand parameter of agroforestry: conventional measurement & FCD estimation.

First results showed that agroforests as habitat obtained diversity indices (H') of moderate category for Kampung Birang and high category for Kampung Merabu. Otherwise, Margalef's index ($D_{mg)}$ for the medium and large tree classes in Kampung Birang and Kampung Merabu were classified as high species richness category. This finding implies that enrichment planting using high economic value species is still necessary in Kampung Birang for species sustainability. Kampung Merabu was found to be more diverse than Kampung Birang, although soil quality in Kampung Birang was better than in Kampung Merabu. Disturbances due to human activities that potentially impact agroforest stability were also pre-identified. Training and further exploration regarding the economic value potentials for species uses and sustainability are necessary in Kampung Merabu. The top ten tree species were classified based on importance value index (IVI) across both villages consisting of 80% shade intolerant and 20% semi-tolerant species. Agroforest showing production and information function as reflected in the top ten species mostly produce various edible fruits that are considered as key component for maintaining biodiversity sustainability and ecosystem functioning.

Second results showed that total carbon stock in Kampung Birang was higher (96.25 t/ha) than that in Kampung Merabu (82.17 t/ha). The regression equation of carbon stock (ton/ha) = 2.21 + 6.75 total basal area ($m^2$/ha) – 0.124 total individuals per ha + 0.170 total species per ha indicated that the carbon was not only effected by a single variable. However, the parameters which consisted of total individuals, total species, and basal area were very strong relation to the carbon stock (91.4 %). Total species per ha effected significantly to the carbon stock (p-value 0.050). Total tree individuals and basal area effected very significant to carbon stock (p-value 0.000). Otherwise, the higher of total tree individuals effected to the lower of carbon stock. In agroforestry practices, how to manage the forest has important role to produce high or low tree diameter. A lot of trees large diameter in Kampung Birang than in Kampung Merabu. The local community in Kampung Birang know well regarding economic value of tree species which produced edible forest fruit, so they manage forest fruit directly and conserve the forest indirectly. Otherwise, the local community in Kampung Merabu did not recognize economic value of tree species. They only consume it, without selling to the other areas. Recently, agroforestry has not been yet directly targeted in REDD+, however agroforestry still can be included in REDD+ strategies, such as provides non-timber forest product, that avoiding leakage from forest conservation efforts.

Third results showed that there was strong significant effect of density to forest canopy density (p-value <0.0001) and strong correlation (r = 0.690). The other variables (basal area) did not effect significantly to the FCD value. It might be because of FCD has a limitation. It could not capture well in multi layers canopy such as agroforestry. However it could be used well to estimate the tree density in a area.

Baseline data and information on biodiversity and sites are of significant importance for sound analysis of economic and ecological benefits of agroforestry. The resulted knowledge is further used to promote the role of community monitoring and biodiversity enrichment planting in the research sites. This new initiative is intended mainly to increase carbon stock, species diversity of economic values and uses (ethnobotanical aspects) and active community participation.

***Keywords:*** *biodiversity, carbon, forest canopy, Kalimantan, REDD+*

## B. Project Activities

- Preliminary research on herbarium collection in Long Duhung, 3-7 January, 2016
- 1st data collection in Kampung Birang and Merabu, 24 January-15 February 2016
- 2nd data collection in Kampung Birang and Merabu, 1-15 January 2017
- As a poster presenter in the 2nd International Symposium on LAPAN-IPB Satellite for Food Security and Environmental Monitoring, 17-18 November, 2015 and the proceeding published on Procedia Environmental Sciences
- Written examination, 26-27 May 2016
- As speaker for special lecture in the International Forest Science Joint Field Study Tour (Kasetsart University-.Kyungpook National University-Bogor Agricultural University-Utsunomiya University), 18 October 2016
- Oral examination, 6 October 2016
- Colloquium, 29 December 2016
- Taking courses in University of Copenhagen on February-June 2017 with the subjects The Art of Scientific Writing, Academic Library, and English Course.
- IPB internal seminar, 30 November 2017
- As a presenter in the International Conference: Society for Indonesian Biodiversity, 5 July 2017 with the tittle was "*Agroforest diversity and ethnobotanical aspects in two villages of Berau, East Kalimantan, Indonesia*" and published in scopus indexed Journal of Biological Diversity, 19 (2): 387-398 on 2 March 2018.

**D. Remaining Activities**

- Dissertation defense
- PhD promotion

## ICS report on project activities

**Dr.Hoang Cam**
*Country coordinator, Institute of Cultural Studies*

**PhD's Student work:**

- 1 PhD student, Hao Phan, has applied for enrolment at ICS. In order to progress while awaiting enrolment, the PhD student has pursued enrolment, coursework and supervision at UEA (2014).
- PhD student Hao Phan will visit University of Copenhagen from 1 August 2016 till 30 January 2017.
- Hoang Cam (ICS), PhD student Hao Phan and Thorkil Casse RUC has conducted two field studies on REDD+ and forest rights in Preteng II of Lam Ha district, Lam Dong province (objective 2)
- The PhD student, Ms. Hao Phan has collected all data in Lam Dong, Vietnam and she has just past comprehensive exam in 2017.
- She will defense her thesis in the mid's 2018.

**Project work:**

- Cam, H. (ICS) has joined as a member of the Sub-Technical Working Groups on Social Safeguards of REDD in Vietnam.
- Dr.Thomas Sikor has problem with his health and Roger Few (UEA) visit to ICS to follow up on Thomas' work on November 2017. Tentative work will be in Lao Cai for REDD impact assessment on safeguard issues. ICS will arrange a meeting to develop conceptual framework for field survey in Lao Cai.

**Publications:**

1. Thomas Sikor and Hoang Cam 2014. REDD+ and the politics of justice in Vietnam. ICS Seminar, Hanoi 2014.
2. Hao 2015. Engendering access to forest and local-national dynamics of REDD+ in the Central Highlands of Vietnam. Southeast Asian Studies in Asia 2015. Consortium for Southeast Asian Studies in Asia, Centre for Southeast Asian Studies, Kyoto University, Japan. 12 - 13 December 2015
3. Sikor, T. and Cam, H. 2016. "REDD+ on the rocks: conflict on the forest and politics of justice in Vietnam. Human Ecology. DOI 10.1007/s10745-016-9821-1.

## ROSKILDE UNIVERSITY'S REPORT ON PROJECT ACTIVITIES

**Associate Professor Ole Bruun and Associate Professor Thorkil Casse**
*Roskilde University*

**Research areas & issues**

1. The socio-economic effects of REDD+ in the highlands

2. The local government structures for REDD+ implementation and administration

3. How REDD+ activities fit in with existing development policies for rural areas and the highlands

**Progress reports and results**

**1. The socio-economic effects of REDD+**

- So far, the socio-economic effects of REDD+ have been very limited, since we are still in the stage of preparation (Phase II) and no actual payments have yet been made through benefit sharing mechanisms
- Household surveys and interviews in Lam Dong and Lao Cai reveal that REDD+ programs mostly have had negligible impacts up until now, and that general awareness of REDD+ is low
- Some small funding made available directly to REDD+ programs at district level, such as in Lao Cai province, were seen to be allocated partly to developing new economic activities such as planting new tree crops, raising pigs etc., thus potentially diversifying and improving the livelihoods of some households. Another visible activity was building small waste incinerators

**Structural issues and poverty in the highlands**

A vital aspect of highland development, which at the same time forms background for REDD+, is the economic marginalisation of highland people that has taken place during the reform period.

* Non-Kinh populations groups now constitute by far the largest segment of poor people in Vietnam, and both surveys and interviewing confirmed their low level of existence and many challenges in life.

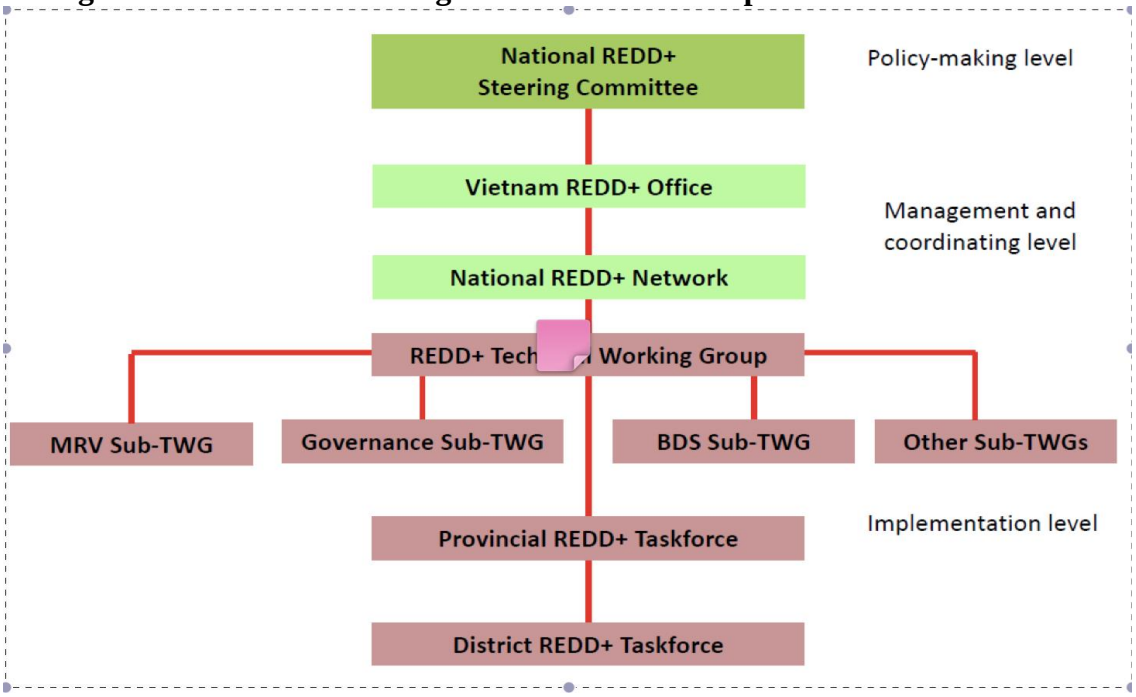
* One such challenge relates to the highland ecology, which has undergone a vast transformation process resulting in local people having lost access to forest products while depending on small paddy mono-cropping farms (often with low yields and subject to grain diseases).

**Table 1. Poverty and extreme poverty levels in Vietnam (in percent)**

| | Ethnic minority poverty /extreme poverty | Majority (Kinh/Hoa) poverty / extreme poverty | Overall poverty / extreme poverty | Minority people's share of all poor / extremely poor |
|---|---|---|---|---|
| **1992** | 86.4 / 52.0 | 53.9 / 20.8 | 58.1 / 24.9 | 18 / 25 |
| **2006** | 52.3 / 29.2 | 10.3 / 3.2 | 16.0 / 6.7 | 46 / 60 |
| **2010** | 66.2* / 37.4* | 12.9* / 2.9* | 20.7* / 8* | 47 (66* ) / 70* |

*Sources: Dang 2010: Table 2, World Bank 2012. Data are based on calculations from World Bank Living Standards Surveys (2000 and 2001) and Vietnam Household Living Standards Surveys (1992 and 2006)*
** Poverty measured by new GSO-WB poverty line (WB 2012: 2, 5)*

**Figure 1. Institutional arrangement for REDD+ implementation in Vietnam**




**Complexity of national level REDD+ participants and stakeholders**

- **Steering Committee:** The Office of the Government, Ministry of Natural Resources and Environment (MONRE), Ministry of Planning and Investment (MPI), Ministry of Finance (MOF), Ministry of Science and Technology (MOST), Ministry of Foreign Affairs (MOFA), National Ethnic Committee (CEMA)

- **National REDD Network:** Representatives of MARD Departments, including, Vietnam Administration of Forestry, International Cooperation Department (ICD), Planning Department, Finance Department, Department of Science, Legislation Department, Coordination Office of the Forest Sector Support Partnership (FSSP), Forest Science Institute (FSIV), Forest Inventory and Planning Institute (FIPI) The International Support Group for Environment (ISGE) Department of Meteorology and Climate Change of MONRE Department of Agro-economics of MPI, JICA, GIZ, ADB, WB, Norwegian Embassy, Finnish Embassy, SNV, FFI, WWF, CARE international, ICRAF, RCFEE, and numerous other NGOs
- **Technical Working Group and Sub-Technical Working Group:** (i) REDD+ Governance; (ii) Measurement, Reporting and Verification (MRV); (iii) REDD+ Financing and Benefit Distribution; (iv) Local Implementation of REDD+; (v) Private Sector Engagement; and (vi) Safeguards. STWGs meet more regularly, about every two months
- **National REDD Office:** "The success of the REDD+ Initiatives in Vietnam is dependent upon the degree of participation and capabilities of local organizations and communities".

**2. Local government structures implementing REDD+ (decreasing complexity from central to local level)**

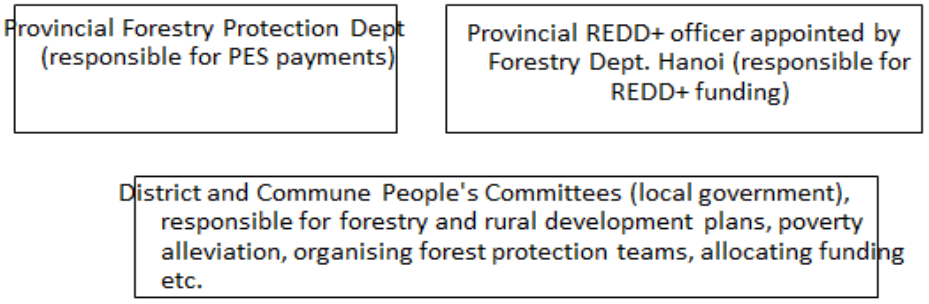



**Table 2. Some simple questions from survey (Lao Cai)**

| **149 Households** | **Yes** | **No** | **Don't Know** |
|---|---|---|---|
| Have you ever heard about REDD? | 108 (72%) | 41 (28%) | |
| Do you believe you could benefit from a REDD program? | 91 (61%) | 23 (15%) | 35 (24%) |
| If REDD is implemented, do you think you can use the forest as before? | 14 (9%) | 134 (90%) | 1 (1%) |

**3. How REDD+ activities fit in with existing development policies for rural areas and the highlands**

National Target Program for New Rural Development (including new planting techniques, increasing agricultural productivity, developing new livelihoods)

* National Target Program for Sustainable Poverty Reduction Support (including vocational training, job creation and income increase, how to do business, transfer of techniques and technologies of production etc.)

* Nationwide Payments for Ecosystem Services (PES) under the Forest Protection and Development Fund (conditional payments for forest protection)

* A long range of earlier Programs, such as 135, 327, and the 661 Program of 1998 had similar objectives, such as to improve forest productivity and support the livelihoods and job opportunities in the highlands, while at the same time sedentarising highland peoples.

**REDD+ appears to continue existing development priorities!**

High economic growth

* Emphasis on agro-forestry and cash crops

* Transformation of barren land and degraded forest to production land

* Elimination of traditional agricultural techniques and swidden cultivation

* High reliance on monocropping

* Little concern for sustainability and biodiversity conservation

When district authorities were asked if REDD+ activities were integrated into existing government programs, they mostly answered **'Yes!'**

**Challenges: The highland ecology and the traditional highland people are a critical stage!**

A range of reports from USAID, WWF, IUCN, Ministry of Natural Resources and Environment, and independent scholars point out that biodiversity in the highlands is at a critical threshold and species disappear fast.

At the same time, traditional highland people are under considerable stress from changing forestry patterns (conversion to plantation forestry).

Several international scholars have pointed out that Vietnamese forest governance is less concerned with managing forests than with managing people and society!

Natural resource management tends to build on a pragmatic-functionalist (utilitarian) approach to nature as opposed to one of intrinsic value, such as expressed in the biodiversity convention.

**Asking the right questions!**

Both NGOs, indigenous people's organisations, and independent researchers are increasing critical of REDD+

Even international organisations like ADB, CIFOR and others have raised considerable doubts of its long term effects on carbon emissions

At the same time, REDD+ risks becoming another well-intended program with unintended consequences for marginal population groups

But instead of critics arguing against REDD+ we should expect its proponents and funding agencies to clearly explain its value and demonstrate its relevance!

## VNUA REPORT ON PROJECT ACTIVITIES

**Associate Professor, Dr. Nguyen Thanh Lam,**
*Country Coordinator, Vietnam National University of Agriculture*

**Works have been done at Vietnam National University of Agriculture**

- Selected study sites in Bac Kan province
- 2 PhD students (Nui + Son) + PhD student Ms.Nerea
- Joint fieldworks: 2014,2015,2016, 2017
- Seminar/workshop to disseminate results (July 2016).
- One chapter and more than 10 published papers based on PhD works.

**PhD student's work, Mr. Nguyen Hai Nui**

- University enrollment: July, 2014
- Take courses in Copenhagen (6 months)
- Finished all prescribed subjects at VNUA
- Thesis: Completed the research proposal with clearly defined objectives and research questions. The literature review has completed. Both primary and secondary data were collected quite sufficiently. Sample size is 265 households living near forest. The data is aggregated and processed basically. Draft thesis in Vietnamese
- Publication relates to PhD thesis: 5

Need to extend 6 months to finish PhD's program.

**PhD student's work, Mr. Cao Truong Son**

- University enrollment: June, 2014
- Thesis Proposal approved in 2016
- Fieldworks have been done.
- 08 Papers (Vietnamese)
- 01 chapter (English) at Elserver publication
- Take courses in Copenhagen (6 months)
- Participate and disseminate results in 03 workshops
- Draft thesis (version 1) have been developed.

Need to extend 6 months to finish PhD's program.

**Joint fieldwork in Ban Duong, Ba Be National park (2015)**

- Established 30 plots around the forest to monitor the diversity of trees in Ban Duong
- 477 trees were marked, tagged and identified by local experts
- 110 of those trees were identified by a botanist.

**Joint Fieldwork 2017**

- Roskilde University, VNUA, REDD office in Lao Cai
- April-May 2017 in Bao Yen & Bao Thang, Lao Cai province
- Survey 248 HHs
- Database developed
- Potential Paper development.

**The remaining works**

- PhD students (Nui&Son) need extent 6 months
- Revised Outputs of final workshop
- Synthesis papers based on the field works
- Policy brief on local community biomass and Carbon stock monitoring
- Policy brief to develop guidance on assessment of equitability and transparency of PES
- Disseminate results to local authorities
- Audits.

## IFRO REPORT ON PROJECT ACTIVITIES

**Dr.Ida Theilade**
*Project coordinator*
*Institute of Food and Natural Resource Economics*

So, here we are. The yellow helmets of IPB research forest some four years ago. Before I talk about the IFRO project activities, I like to show you a few slides from our start-up workshop in 2014.

Except for the yellow helmets, we started out as a very diverse group with not much sense of direction.

We had to get to know each other, each other's research interests, we had to find common goals. And we had to agree on a common direction.

But during our field trip to the IPB reforestation site, we did start to come together in groups and find common ground. I am still amazed how well Thorkil managed to camouflage himself in this photo… And Prof Dodik is probably looking for Ole. Ole probably escaped to look for birds. At least I remember Ole escaping through a window when I talked too long about budgets.

**Coming together as a team**

Looking back, I think we did accomplished a lot during the workshop in Indonesia. I remember long afternoons and evenings working on those budgets. Martin is holding the PC with the resulting budgets very tight in this photo. I think we laid the foundation for 4 years of collaboration: often through e-mails only. But based on the friendship and trust which was cultivated at this first workshop.

**Fieldwork in two countries and many sites**

**Figure 1. Field work for tree identification in Ban Duong hamlet, Ba Be district, Vietnam (May 2015)**

Fieldwork diligently arranged by IPB, ICS, and VNUA.

From IFRO PhDs Søren and Nerea conducted much of the field work.

Henrik and Martin went to Vietnam and Martin and Ida to Indonesia.

**More data collection**

Fieldwork was often carried out under difficult conditions and involving many people.

Our project integrates natural and social sciences but always with a common point of departure in empirical data collection.

Difficult to bring justice to the efforts put into the data collection from many trips, lots of logistics, visas, transport, translators, community involvement, and lots of mud.

**Training of parataxonomists in Berau**

**Figure 2. Fieldwork and training in Berau, Indonesia**

Same goes for Indonesia. I lost track of how many trips Søren, Adisti, Dyah and Yanto made to Berau. I just know that Pak Deden did even more. We have some very interesting results on community monitoring of biodiversity from Long Duhung, which Pak Deden will share with you tomorrow.

**And some beautiful results**

I do not have photos from the fieldwork conducted by Dr Cam, Hao and Thomas. But I do have some great photos of one of the outcomes. We already produced some 15 scientific papers, 2 book chapters, policy briefs and many other outputs. I am confident that many more papers will be published in the next 1-2 years to come.

**What did we do at IFRO?**

Many IFRO activities took place in Vietnam and Indonesia.

We participated in data collection.

Supervision and co-supervision of 8 PhD students.

Study stays for 6 PhD students at KU.

3 write-up workshops for PhD students at KU.

Indonesian delegations visited KU.

Funding applications on oil palm and development (DFID).

Policy brief presented at COP in Doha.

Conferences in UK, Spain, Holland, Portugal, Denmark.

2 Danish PhDs submitted by end of 2017.

Coordination.

Administration and progress reports.

Budgets and accounts by Huimin.

Henrik became a Professor

Martin became an Associate Professor

Greetings from Huimin. Grateful for your efforts to submit accounts on time. She would have loved to be here.

**What remains to be done? Publication and dissemination**

What remains to be done? Publication and dissemination. This is what will bring us forward as individuals and as institutions. Re-visit our strategy.

Another objective of the FFU research projects is to build new partnerships. I hope the present workshop will facilitate even more cross-collaboration and new ideas for future research.

Our dissemination strategy works at three levels: (i) publication of scientific results, (ii) dissemination to policy makers, (iii) capacity building and dissemination at community level.

*Publication of scientific results*

10 publications in international journals, preferably open access journals.

15 presentations of papers at international and regional conferences and workshops. Funds provided for PhD and senior staff to participate in academic conferences.

1 Academic book published on REDD+ social safeguards, governance and participatory monitoring. PhD students contribute with chapters based on their thesis.

*Dissemination to policy makers and civil society:* Policy briefs distributed at COP meetings, REDD+ policy meetings, and to UN-REDD and/or FCPF working groups at national level. Policy briefs in Vietnamese and Indonesian.

Senior researchers participate in REDD+ developments within the two countries.

*Capacity building:* 8 PhD candidates.

*Dissemination at community level*: Results returned to communities for their usage in decision-making and onwards REDD+ involvement.

## SECTION 2
## PH.D STUDENT'S WORKS AND PRESENTATIONS

SUMMARY

*In this part, each PhD student has to present their Progress report & Key findings from their own thesis. All students have enrolled in PhD program for more than 3 years, i.e. 3 from Indonesia, and 3 from Vietnam. The supervisors and all participants will ask Questions and Discussions on their findings and provide suggestions for further improvement of PhD works.*

# EVALUATION ON ECONOMIC, SOCIAL AND ENVIRONMENTAL EFFECTS OF FOREST MANAGEMENT THROUGH PAYMENT FOR ENVIRONMENTAL SERVICES IN VIET NAM – A CASED STUDY IN BABE DISTRICT OF BACKAN PROVINCE

**Mr.Cao Truong Son**
*PhD Student, Faculty of Environment, Vietnam National University of Agriculture*

## 1. Backgroud

Payment for environmental service (PES) is an incentive-based mechanism under which the users or beneficiary of an ecosystem service make a payment to ES providers (Engel & Palmer 2008). PES is hence understood as an economic instrument that allows ES users to pay ES suppliers for the maintenance of these services. In addition to this, PES contributes to create a sustainable financial mechanism for protecting natural resources and environment. Therefore, PES has been receiving increased attention from the world community over the past decade. Numbers of PES programmes have been successfully implemented worldwide at national, regional and local levels, such as the National Payment for ES Program in Costa Rica (Pagiola 2008) and Mehico (Munoz et al.2008), agricultural environmental plans in Europe and the North of America (Baylis et al.2008; Claassen et al.2008; Dobbs & Pretty 2008), the priority and encourage conservation policies (Hardnerand Rice 2002; Niesten et al.2004), and carbon stock program (Smith & Scherr 2002).

In Vietnam, pilot PES projects have been implemented in Lam Dong and Son La province since 2008. Lessons from these cases were reviewed and have became a solid foundation for Decree No. 99/ND-CP about payments for forest ES (PFES). Decree No.99 is initial legal document that plays significant role for PES implementation in Vietnam. Through the promulgation of this decree, Vietnam has become the first country in Asia institutionalizes national policy on PFES (Pham Thu Thuy et al.2013).

This study was conducted to assess the effectiveness of Vietnam's PES policy on all three aspects of economic, social and environmental aspects. Ba Be district of Bac Kan province was selected as a research site due to the availability of PES programs representing Vietnam.

## 2. Objectives

This study was carried out to achieve the following objectives:

- To evaluate the implementation proccess of payment for forest environmental services (PFES) in Vietnam.

- To show the effectiveness and impact of PFES policy on forest protection activities and livelihoods of local people.
- To give appropriate recommendations for improving and promoting forest management through the payment of environmental services in Vietnam.

**3. Contents**

To achieve the objectives of this study we focus on five contents which are showed in figure 1.

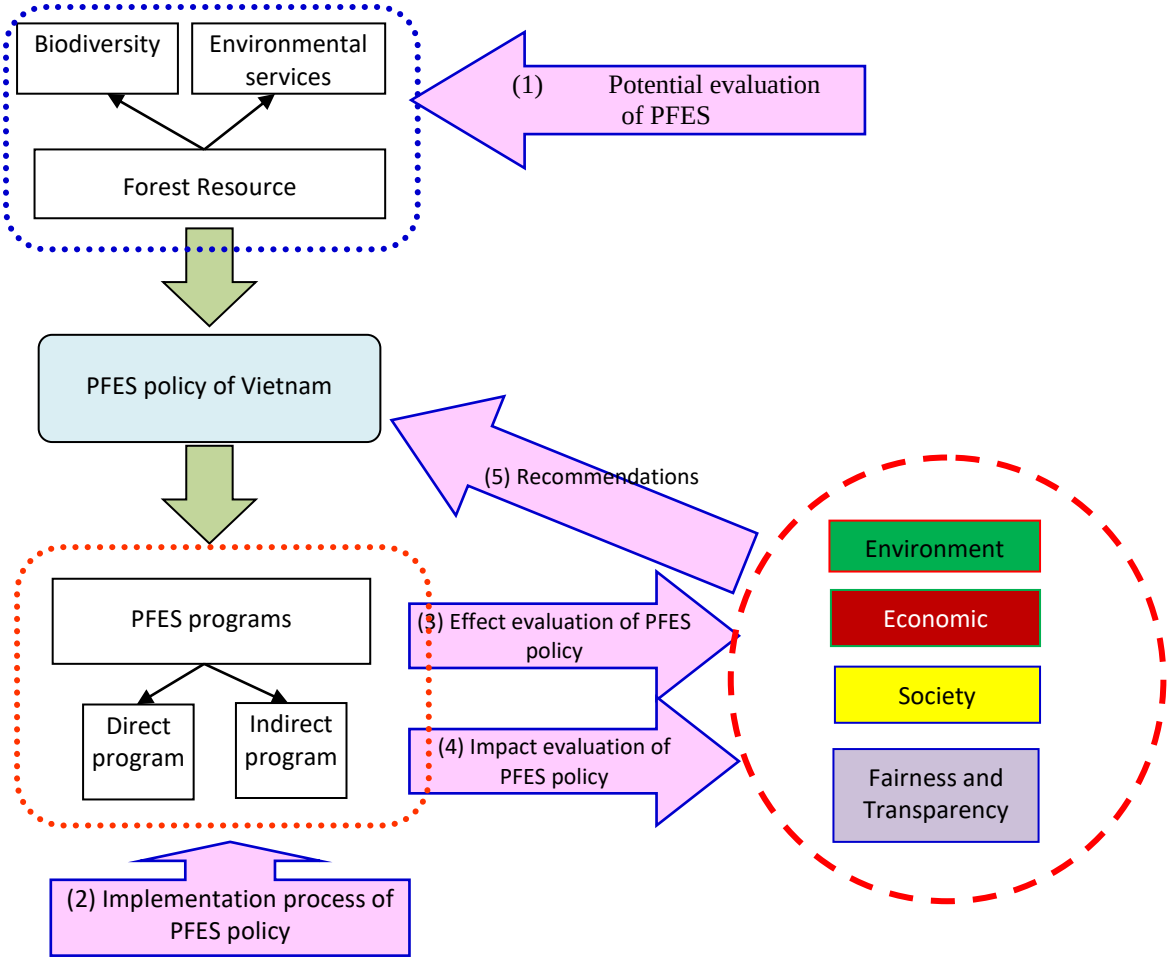



**Figure 1: Framework of the study**

**4. Methods**

In the study, we used some main methods, including:

- Participatory research assessment (PRA) tools, including key informant interview, household interview, group discussion with villagers, mapping draw by local people, village history and SWOT analysing with villagers...

- Total economic value (TEV) method was used to show the economic value of environmental services in forest of Babe district.
- Effect assessment of PFES method based on 3 aspects including: economic, environment and society.
- Impact assessment of PFES method: Used *"diff in diff - DD"* method.

**5. Results**

This study have achieved some main results as:

- Quantify the value of PES for Ba Be district according to the PES policy of VND 23.7 billion/year (average VND 530,000/ha /year). However, only 10.38% of the total potential value has been exploited.
- Ba Be district has implemented a PES policy since 2013 and has established two direct and indirect PES programs. The programs are developed and implemented in accordance with the theory of PES and PES policy in Vietnam.
- The results of the economic, social and environmental impact assessments show that both PES programs were assessed at an average level. Fairness and transparency are highly appreciated by stakeholders. However the implementation of these criteria has not actually been achieved.
- The policy of PFES in Ba Be district has had positive impacts on forest protection, awareness of forest environment functions and forest protection force of local people. However, the economic impacts of this policy is not yet clear.

**6. Publications**


1. Cao Truong Son (2015). *Payment for Environmental Services (PES) – A new tool in natural resource and environmental management*. Journal of Natural resource and Environment. No 21 (227) November/2015, pp 24-26 (In Vietnamese).
2. Cao Truong Son, Nguyen Thanh Lam, Nguyen Thi Thuy Dung, Nguyen Thi Huong Giang (2016). *Analyzing vuluntarry of payment for forest environmental service in Ba Be, Bac Kan*. Journal of Agriculture and Rural Development in Vietnam, No 17/2016, pp 110-117.
3. T.D.Vien, C.T.Son, N.T.T.Dung, N.T.Lam (2016). Redefining diversity and dynamics of natural resource management in Asian - Chapter 5: *"A voluntary model of payments environmetal services: Lessons from Ba Be district, Bac Kan province of Vietnam".* Volumm 2, Elsevier Publishing ISBN 9780128054536.
4. Cao Truong Son, Nguyen Thanh Lam, Tran Đuc Vien (2016**).** *An overview theory about payments for environmental services.* Journal of Agriculture and

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**7. Plan for future**

- Completion of the PhD program in the first quater of 2018.
- Analyze the PhD student database to write international articles.

# SUSTAINABLE LIVELIHOOD DEVELOPMENT FOR FOREST DEPENDENCE DWELLERS IN BACKAN PROVINCE, VIETNAM

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## Thesis objectives

This study examines the livelihood development of forest dependent households through a study in Bac Kan province, Vietnam. The following questions are addressed:

What are the characteristic of forest dependent households?

What are their livelihood strategies related to forest resources?

How are their livelihood capitals, livelihood outcome?

How are their livelihood comparing with 5 year before?

How sustainable are their livelihood?

## Methodologies

- Study side:
  - Babe district: Hoang Tri and Dong Phuc commune
  - Nari district: Lang San and Van Hoc commune
- Sample size: 265 households
- Descriptive statistics are used to describe livelihood capitals as well as household livelihood strategies
- Statistics test: T-Test, Chi square test, Anova analysis
- Regression: logit, multi-logit, multi-regression
- Likert Scale

## Implemented results

- Finished all prescribed subjects at VNUA
- Thesis: Completed the research proposal with clearly defined objectives and research questions. The literature review has completed. Both primary and secondary data were collected quite sufficiently. Sample size is 265 households living near forest. The data is aggregated and processed basically. Draft thesis in Vietnamese
- Publication relates to PhD thesis: 5

**Paper 1: Effect of livelihood capitals to livelihood strategy selection of forest dependent people in upland areas of Backan province, Vietnam**

The aim of this study is to assess the situation of livelihood capitals as well as their impacts to the strategic livelihood alternatives of forest-dependent people in upland areas of Bac Kạn province. The data were collected through directed interviews from 261 households living near forests in the districts of Babe and NaRi. Methods of descriptive statistics, comparison, ordered logit model and student T-test are used in the study. The results reveal that degree of the forest-dependent households is still high. The stronger livelihood capitals and higher income households tend to select the low forest dependent strategy. In contract, the high forest dependent strategy is selected by the households with lower income and limited livelihood capitals. To enforce the policy to restrict access to forest resources to protect and maintain forest area, the State should adopt measures to reduce reliance on the forest, while improving the livelihood capitals, especially human capital for the people.

**Paper 2: Sustainable livelihood models for ethnic minorities**

This study aims to develop a sustainable livelihood model for ethnic minorities based on livelihood sustainability through the Sustainability Scale. Study using a sustainable livelihood approach and agroforestry model. Data were collected from 620 households in Quang Ngai and Bac Kan. The results show that ethnic minority people have high natural ecological welfare index. However, social welfare - humanity is lower than average. Mostly, the livelihood of ethnic minorities in low or medium level in sustainable. In order to develop sustainable livelihoods for ethnic minority people, each locality needs to build up integrated models of livelihoods in the direction of exploiting their specific resources. Priority will be given to the model of the garden and forest, model of sloping land cultivation, forest model in the direction of community forest management, payment for forest environment services, cultivation model in the direction of improving cultivation techniques. , the breeding model towards specialty products such as chicken gi, wild boar.

**Paper 3: Alternative Livelihood Strategies of Forest Dependent Ethnic Minorities within a REDD+ Implementation Area in Bac Kan Province, Vietnam**

The livelihood strategies of rural households in Bac Kan of Northern Vietnam derives from various sources of which crop income is the most important and income from forest collection is the second one. In addition, the number of forest dependent households is high. Households with a high forest reliance livelihood strategy tend to obtain lower total income. And poor household rely more on forest income than non-poor household. However, although poor household relies more on forest products they obtain lower absolute forest income than non-poor household. Comparing ethnic minorities the Dao ethnic group is both the poorest and the most reliant on forest income.

Hence, implementation of REDD+ will if restricting access to forests potentially have negative implications on household welfare of the poor and ethnic minorities and particularly the Dao ethnic group in Bac Kan. REDD+ Carbon payment needs to be substantial and distributed at the village level to offset such negative welfare implications of restrictions on forest resource use. The benefit sharing mechanism needs to be framed appropriately and transparently and implementation of REED+ activities and support for developing rural livelihoods has to be balanced appropriately. The focus should be on the poor and the Dao ethnic minority.

*(Presented at Conference on International Research on Food Security, Natural Resource Management and Rural Development (Tropentag, 2015, Germany))*

**Paper 4: Effect of livelihood capitals to the income of forest dependent households in upland areas of Backan province**

The aim of this study is to assess the impacts of livelihood capitals to income of forest-dependent households in upland areas, BacKan province. The data were collected from 218 households living near forests in the districts of Babe and NaRi. Methods of descriptive statistics, multiple regression, one way anova, student T-test and Chi squared test were applied in this study. The results reveal that degree of the forest-dependent households is still high; The high forest-dependent households' livelihood capital is weaker than the lower forest-dependent households'; The stronger livelihood capitals and higher income households seem to be low forest dependent. The effect of livelihood capitals to household's income is significant. To enforce the policy for increasing the income while restricting access to forest resources, the State should adopt measures to reduce reliance on the forest, while improving the livelihood capitals, especially human and financial capitals for the households.

*(Vietnam, Jounal of Economics and Development, vol 11, 2016)*

**Paper 5: Effects of Livelihood capital on poverty of forest dependent households in upland area: a case study in BacKan province, Vietnam**

Bac Kan is a mountainous province with the highest forest cover rate in Vietnam, the dependence on the forest resources of the dwellers is still large. The aim of this study is to assess the situation of livelihood capitals as well as their impacts to the poverty status of forest-dependent households in upland areas of Bac Kan province. The data were collected through directed interviews from 218 households living near forests in the districts of Babe and Nari. Methods of descriptive statistics, comparison, logit model and student T-test are used in the study. The results reveal that the poor rate the forest dependent households is still high; The households livelihood capital is still weak; The stronger livelihood capitals households seem to be non-poor. The effect of livelihood capitals to household's

poverty status is significant. In which, human and financial capitals have the most impact. The estimated logit model is highly confident with 87.16% of correct estimation. In poverty reduction program, the State should improve the livelihood capitals, especially human and financial capitals for the households.

*(International Congress and General Meeting – National and Global good Agricultural Practices (GAPs) in Southest Asia (ISSAAS, 2016, Vietnam))*

# BIODIVERSITY AND CARBON STOCKS MONITORING IN VARIOUS AGROFORESTRY PRACTICES BASED ON PARTICIPATORY APPROACH

**Ms.Adisti**
*Ph.D student, IPB*

## 1. PROJECT DESCRIPTION

### 1.1 Background

The increasing loss of Indonesian primary forests has significant implications for climate change mitigation and biodiversity loss. REDD+ is a global instrument proposed to address the issues. In Indonesia, however, an assessment is still required for the REDD+ implementation, particularly to address the locally specific conditions. REDD+ aims to reduce emissions from deforestation and forest degradation, conservation, enhancement of forest carbon stocks, and sustainable forest management (SFM) through considering socio-economic, and ecological aspects. A way of accommodating these aspects is done through agroforestry since its close link with local knowledge and community participation.

The potential of REDD+ implementation in Berau District, East Kalimantan, Indonesia is high, but it still need to be observed carefully due to the on going threats of degradation and deforestation. There are still challenges to be addressed with respect to local capacity and the use of technology for enhancing the community participation. In Berau agroforestry, fundamental knowledge on plant identification including local name and tree inventory are still incomplete leading to difficulties in estimating the biodiversity status. On the other hand, identification of forest land cover can be done quickly, cheaply, and periodically by remote sensing technology such as using NDVI (Normalized Difference Vegetation Index). However, it has limitation due to no parameters of thermal, bare soil and shadow. FCD (Forest Canopy Density) mapping model can be useful tool for identifying forest status due to its full consideration on vegetation, thermal, shadow, and bare soil indices.

Baseline information regarding the biodiversity and carbon stock status in agroforestry practices in Berau is indispensable and is needed to be determined by utilising data generated from traditional and modern tools in order to define the potential role of existing agroforestry in the REDD+ implementation.

### 1.2 Objectives

The specific objectives of this research were: i) to characterize agroforest diversity with respect to tree structure and composition, and to determine ethnobotanical uses in agroforestry practices, ii) to develop the correlation between biodiversity and carbon

stock status in agroforestry practices, iii) to develop the correlation between remote sensing (forest canopy density value) and stand parameters (tree density and basal area), and iv) to calculate the cost effectiveness of community monitoring on carbon stock to estimate carbon price.

**1.3 Design**

Fieldwork was conducted in Kampung Birang and Kampung Merabu, Berau, East Kalimantan. Selected plots based on forest canopy density values resulted from forest canopy density mapper. There were 5 classes of FCD values. Each class consisted of 6 plots in a village. So the total of plots in both villages were 60 plots (size 50 m x 50 m). Local community members were trained in plot establishment, tree diameter measurement, tree tagging, herbarium collection, and canopy profile measurement. Local community members identified tree species by local names and listed the species uses.

2. RESULTS

There are research outputs in terms of publications, as follows:

2.1 Hartoyo APP, Siregar IZ, Supriyanto, Prasetyo LB, Theilade I. 2016. **Biodiversity, carbon stocks and community monitoring in traditional agroforestry practices: preliminary results from two investigated villages in Berau, East Kalimantan**. *Procedia Environmental Sciences*, 33 (2016): 376-385.

Traditional agroforestry practices in Berau, East Kalimantan, are suitable land use types to conserve that potentially support the implementation of REDD+. The objectives of this research were to assess biodiversity and carbon stock in various traditional agroforestry practices, also to determine the accuracy of the ability levels of local community in biodiversity and carbon stock monitoring. This paper presented the implementation plan and preliminary data in Kampung Birang and Kampung Merabu, in Berau District. The results showed that: *First*, professional forester-led methods of biodiversity and carbon stock assessment follow the recommended procedures, while training component are carried out using different method in order to test the accuracy of monitoring level. *Second*, data collection in both villages identified main fruit trees, locally known as langsat, in Kampung Birang, while different durian were found in Kampung Merabu. *Third*, the total time taken for completing the monitoring work has declined in line with the work cycle progress supported by willingness of community to participate in the monitoring program.

***Keywords:*** *agroforestry; Berau; biodiversity; carbon stocks; REDD+*

2.2 Hartoyo APP, Supriyanto, Siregar IZ, Theilade I, Prasetyo LB. 2017. **Agroforest diversity and ethnobotanical aspects in two villages of Berau, East Kalimantan, Indonesia**. Submitted on *Journal of Biological Diversity*.

The increasing loss of Indonesian primary forests has significant implications for climate change mitigation and biodiversity conservation efforts. An assessment is needed as a requirement for REDD+ implementation. REDD+ aims to reduce emissions from deforestation and forest degradation, conservation, enhancement of forest carbon stocks, and sustainable forest management (SFM). The objectives of this research were to characterize agroforest diversity with respect to tree structure and composition, and to determine ethnobotanical uses in agroforestry practices. Fieldwork was conducted in Kampung Birang and Kampung Merabu, Berau, East Kalimantan. This research focused on measuring trees which were classified into two size classes, namely medium trees (10≤dbh≤20 cm) and large trees (dbh>20 cm) due to the ability of both size classes to survive more than the other tree growth levels. Local community members were trained in plot establishment (60 plots, 50x50 m), trees diameter measurement, trees tagging, and herbarium collection. Local community members identified tree species by local names and listed the species uses. The agroforest stand structure reflected in relationship between diameter class and number of individuals in Kampung Birang and Kampung Merabu resulted in reversed J-curve. The total number of species and individuals recorded in Kampung Merabu were higher than in Kampung Birang. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. There was an indication of the human disturbances. *L. parasitum* (langsat) dominated at medium and large trees in Kampung Birang. *V. pinnata* (belangkan/leban) dominated at the medium tree, while *A. elasticus* (terap) dominated at large tree in Kampung Merabu. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. Forests in Kampung Birang and Kampung Merabu were not quite stable (H'= 1.1). There was an indication of the human disturbances. Dominance of species was not found both in Kampung Birang and Kampung Merabu. E value showed moderate evenness and high richness category. Most of the species which belonged to the top ten species with the highest importance value index were edible fruit trees. The other uses of forest are to produce herbal medicines, energy (firewood), materials of building construction, and forage.

***Keywords:*** *REDD+, biodiversity, ethnobotanical, agroforestry, Kalimantan*

2.3. Hartoyo APP, Prasetyo LB, Theilade I, Siregar IZ, Supriyanto, Nielsen MR. 2017. **Relations between stand parameters and forest canopy density based on remote sensing in agroforestry in East Kalimantan, Indonesia** (*On going Manuscript*)

Agroforestry practices is an alternative way to enhance biodiversity and carbon stocks, livelihood, community rights, as well as ecosystem funtions for the implementation of REDD+ (*Reducing Emissions from Deforestation and Forest Degradation*). It was needed for safe guarding program to connect social and economic aspects of the community. Knowledge on the relations between stand parameters and remote sensing in agroforestry practices is lacking. Additionally, identification of forest land cover can be done quickly, cheaply, and periodically by remote sensing. However, some remote sensing methods have limitation indexes for identifying forest status. Forest Canopy Density (FCD) is a remote sensing mapping model that considers vegetation, thermal, shadow, and bare soil indexes. Local community measured density (N/ha) in the field after they trained. The objectives of this research were i) to develop correlation between the value of FCD (%) and density (N/ha), ii) the value of FCD (%) and basal area (m2/ha), iii) the value of FCD (%) and research locations, iv) the value of FCD (%) and biodiversity, v) to explore the profile of forest architecture in agroforestry practices. Plots were surveyed jointly in October 2015. Plot establishment, stand parameters measurement, biodiversity assessment, and canopy profiles measurement were started in January-February 2016 and continued in January 2017. The analysis data was by using tobit model. The result showed, there was strong significant effect of density to forest canopy density (p-value <0.0001) and strong correlation (r = 0.690). The other variables did not affect significantly to the FCD value. The time spent of the local communities effected very significant to the density value (p-value 0.000***) and basal area resulted (p-value 0.024*). The correlation between time spent and density value resulted was 62.7%. The correlation between time spent and basal area was 29.2%. The diversity index in both Kampung Birang and Merabu were classified as the low category. Both villages belonged to high richness category. In general, the higher of individuals number showed the higher of FCD also and it was in line with the higher of density which were measured by the local communities. Therefore, forest canopy density mapper can predicted density in the field.

***Keywords:*** *REDD+, safeguards, remote sensing, tropical forest, Kalimantan, community monitoring*

## 3. WAY FORWARD

The next steps of this PhD research are to prepare the new scientific papers related to: i) the correlation between biodiversity and carbon stock status, ii) calculating the cost effectiveness of community monitoring on carbon stock to estimate carbon price.

# DETERMINING SUITABLE PROPERTY RIGHTS OF FOREST ON REDD+ FRAMEWORK: Lesson from Berau District, East Kalimantan Province, Indonesia

**Mr.Yanto Rochmayanto**
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Clear forest property rights that able to control deforestation is a necessary condition for succesfull REDD+ implementation in Indonesia. But, there is no theoretical or empirical reason for a belief that the particular property rights regime better than the other regulative regime in sustaining forest. Deforestation is highly related to or as a consequency of unsecure forest property rights. Ironically, the efforts to reduce deforestation and its relation to REDD+ readiness in Indonesia through property rights arrangement approaches are missing. A primary research question addressed in the study is how does existing forest property rights regime in Indonesia suitable for REDD+ framework. Therefore, the study aims to: (1) examine forest property rights setting within the national legislation and it's impact on deforestion, (2) identify the influencing factors of forest rights enforcement in local forest managements/institutions in relation to deforestation reduction, adn (3) assess effectiveness of existing forest property rights in local forest managements/institutions on REDD+ framework.

The research was conducted at Berau District, East Kalimantan Province, Indonesia, focused on two local forest institutions, namely: Forest Management Unit (FMU) of Berau Barat, and Merabu Village Forest. Further inquiry was conducted in three villages (Long Duhung, Merapun, and Merabu). Data were collected by survey-based approach, through indepth interviews to key informants in district and site levels, as well as household survey in three selected villages. Historical deforestation was calculated by spatial analysis using satellite imageries. Temporal land cover data was used from 2000, 2006, 2009, 2012, and 2015. Data analysis used both qualitative and quantitative methods, namely content analysis, institutional analysis, livelihood analysis, and stakeholder analysis, as well as scoring system in the assessment of ability to control additionality, leakage, and permanence. Synthesis was prepared by systematic review, which is a method to summarize the results of research to produce a comprehensively research findings.

The study delivers three main conclusions followed by each possibly recommendations. Firstly, Indonesia's national legal framework has not been worked to control deforestation properly. There are two sources of insufficience, namely the

content of statutory laws, and contested rules at local level. Content analysis on 28 national statutory laws revelaed that there were inconsistence on framing forest definition, forest and forest area defined led to missinterpretation, unimplementable regulation on private forest recognition as national forest area, irrelevance of access restriction, and missing regulation on private forest management and alteration rights. Evidence from three selected villages showed that there are three ways on how people react to forest right. The first is congruence between de facto and de jure budle of rights. It was indicate strong forest property rights, and led to well-protected forest. The second is the weak of forest property rights, indicated by double claim of ownership caused by dispute between statutory laws and customary law recognized by people. The third one is very weak property rights, indicated by very close to open access situation. The last two situations indicate an incongruence of de jure and de facto bundle of rights, and lead to deforestation.

Secondly, the study confirms that property rights link to deforestation mediated by a complex interaction among three influencing factors (law and regulation, institutional setting, economic preference). The interaction resulting particular forest performance. Contesting rule between formal and informal is possible to provide forest sustainability. Economics preference plays an important role on how property rights work to control deforestation.

Thirdly, constelation of forest rights on Merabu Village Forest is effective to achieve contextual outcome for REDD+ framework, indicated by its capacity to control additionality, leakage, and permanence. The same forest property rights regime showed the different capacity in supporting REDD+ framework, depend on management type. Type of forest management institution plays an important role to determine their capacity to control additionality, leakage, and permanence. Forest property rights at local forest institution in devolution model is more effective for REDD+ framework rather than decentralized model. However, both local forest institutions do not sufficient yet to improve capacity of community to control additionality, leakage, and permanence.

These findings suggest some policy recommendations: (1) the need of policy improvements to deal with the ambiguous, contradict, and irrelevant regulations, to promote regulation on private forest management and alteration rights, as well as to accelerate recognition of, or promote a programme, to meet various local rules on forest, (2) propose a priority strategy in order to deal with deforestation, namely devolutive programme and economic approach for rural livelihood, (3) to have the FMU improvement, the scale-down of the FMU area is important to localize stakeholder interest and economic preference, to manage local rule-in-use, and to improve the

effectiveness of institutional setting, and (4) priority of REDD+ implementation is in devolutive forest institution.

The study also contributes to theoretical and practical significance, namely: (1) provide a new concept concerning influencing factors of property rights in sustaining forest, (2) provide a standard for conceptual and practical inquiry on REDD+ (or any other land-based environmental service schemes) to deal with forest rigths issue on the ground, and (3) empirical enrichment of the property rights theory focused on deforestation and its implication on REDD+ readiness in the FMU and Village Forest at Berau District, Indonesia.

***Key words:*** *property rights, deforestation, REDD+, Forest Management Unit, Village Forest*

# LIVELIHOOD SYSTEM, RURAL ECOLOGY, AND MORAL ECONOMIC CHANGES OF PUNAN DAYAK COMMUNITIES

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*Dr. Martin Reinhardt Nielsen*

## 1. Background and Objective

Dayak Punan community as a unified system of economic, political, social and ecological entity is currently threatened in the stability and experiences turmoil under pressure both from the government, the private companies, and the NGO. Dayak Punan community expects conservation and development take place in tandem so that local communities do not lose their identity. However, the ease of modern life enjoyed by urban communities also expects to be enjoyed by these communities (Levang et al. 2007). In such condition, **how far is Dayak Punan community regarded as the latest hunter-gatherer tribe in Kalimantan able to maintain their existence**? This study attempted to answer by looking at the process of livelihoods transformation and social change in Dayak Punan community, especially related to:

1. The process of changing the relationship between the Punan Dayak community and the forest as a source of livelihood, and the livelihood strategies that are carried out in the face of the changes.
2. The level of sustainability of the livelihood system of Punan Dayak households based on the level of importance and susceptibility of their livelihoods.
3. The changes of the economic morale of Punan Dayak households based on current community typology.
4. The Mapping of local institutions that capable to guarante and the role of social protection developed by the village government in enhancing the livelihood of households in the Punan Dayak community after the entry of the 'new' economic system.

## 2. Research Framework

This study follows the framework of sustainable livelihoods Scoones (1998), context-conditions and trends that occur in the community replaced with stressors. The Dayak Punan community, which is a community of hunter-gatherers, is gradually changing with the government's development programs, the development of large-scale economic activities by companies, and the empowerment programs undertaken by

NGOs. These three stressors either directly or indirectly affect the livelihood system. To observe the transformation process, this research borrows the framework of livelihood system developed by Dharmawan (2007) which sees the livelihood characteristics in the countryside of three important elements: social infrastructure, social structure, and supra social structure. The analysis of livelihood infrastructure will use the five livelihood assets introduced by Scoones (1998), namely natural resource capital, physical capital, financial capital, human capital and social capital.

These three elements of living will determine household livelihood strategies. Borrowing the Ellis framework (2000), the determinant factor that is the reason for households to diversify their livelihood strategies are two, namely compulsion or choice. This reason is considered particularly important if there is a conflict of interest in determining forest use. Another factor that must also be taken into account is the satisfaction of the household itself to the forest as its source of livelihood. If the existence of the forest is no longer able to meet the needs of households or households are no longer satisfied with the forest as a source of livelihood, it is possible that households or communities tend to change the function of forests for other purposes or find other alternative income outside the forest. This condition certainly poses a risk to the vulnerability and the livelihood of households that will repeatedly redefine the rural livelihood system dynamically. In summary Figure 1. can illustrate the frame of mind that is the direction of this research.

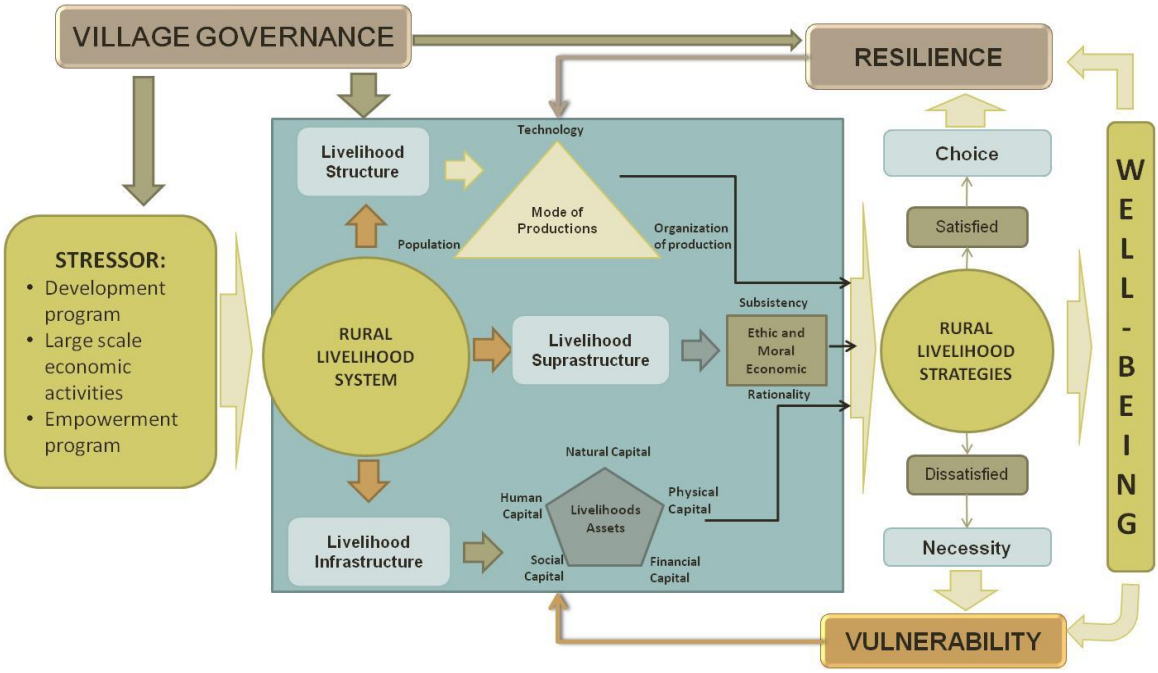


**Figure 1. Framework of thinking for the rural livelihoods transformation (adopted from Scoones 1998; Ellis 2000; Dharmawan 2007; Scoones 2009)**

## 3. Methodology

This research used *post-positivism* paradigm methodology. The research strategy used a mixed method i.e. by mixing the qualitative and quantitative methods. Qualitative method used several methods such as in-depth interviews on several related key informants, direct observation by directly living with the communities in the research location for some time, and literature/documentation study to complete the data and information obtained directly in the field. Meanwhile, quantitative methods used two methods, those are: (1) Poverty Environment Network/PEN *(Angelsen et.al. 2011,)* and Importance-Performance Analysis/*IPA* (Martilla and James, 1977). This research was analysing in two levels. The meso level with the analysis unit at a community or village level, there were four communities of Dayak Punan as unit analysis, namely: Punan Communities at Birang Village; Long Duhung Village, Merabu Village, and Merapun Village. And the micro level (the household level) used approximately 130 households as respondents from four communities.

## 4. Result

### *4.1. People and Forest*

The depth of the interaction between the Dayak Punan community factors driving change, determine the direction and speed of the process of transformation of livelihoods system. It is characterized by a low proportion of income from the forest. As a community of hunter-gatherers, the forest is the main source of livelihoods, the entry of large-scale economic activity, not only restricting community access to forests but also alter the landscape forests into plantations or other forms of agricultural businesses. Activities that generate cash income, the main choice of households to meet their daily needs that now have to be purchased. Working in the company, daily wage labour, and business/trade into new sources of livelihood for households depending on livelihoods capital owned. Gold extraction and hunting honey become a major source of income from forests that in some communities can still be maintained.

### *4.2. Livelihood Sustainability: Resilience vs. Vulnerability*

Households, who have limited access to capital income, tend to live on the verge of subsistence limit. Corporate social responsibility and corporate compensation, either in the form of money, food, health care, scholarships or other forms, is a double-edged sword in the community. On one hand guarantees the subsistence needs of the household, on the other hand increasing the household dependency on outsiders. In these cases, the existence of new sources of livelihood does not encourage households to make a livelihoods diversification strategy. In fact there is a tendency of domination of livelihood, which not only increases the vulnerability of living, but also raises the income gap among households in the community.

### *4.3. Local Institutional and Livelihood Security: Ethic and Moral Economic*

The options of livelihood strategies depending on the type of rationality underlying household measures. Punan Dayak community known as hunter-gatherers is an egalitarian society, economically autonomous, and work together in a collective economic activity by sharing forest products (Sellato 1994). The character can be regarded as forms of action on the basis of substantive rationality (case in Punan 2 community). After getting to know the importance of money and materialistic lifestyle, many households are more action based on subsistence pragmatically. An easy way to get cash is the main reason of households in search of gold, catch birds even agree to permit the opening of large-scale plantations replace forests which had been the main source of household income. Practical rationality is the basis of the action, as happened in Punan 1, Long Duhung and Merapun. Improving the quality of human resources has prompted a change of mindset households in managing natural resources. Establishment of local agencies to manage forests, improve use forests more sustainably without leaving the economic benefits. This occurred at Kampung Merabu choosing eco-tourism as a new income source more sustainable. Households in Kampung Merabu action can be said to be based on formal rationality.

## 5. Conclusions

The SIGAP REDD + program implemented by NGOs has provided a new livelihood alternative for Punan Dayak communities, through ecotourism development. Community interaction with forests is balanced and mutually beneficial, so that community livelihood systems are more resilient. The opposite condition (more vulnerable), occurs in Punan Dayak communities whose access to forests is very limited, but there is no alternative source of livelihood.

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## ACTIVITIES PERFORMED

1. Presenter on Human Ecology Conference, Faculty of Human Ecology, Bogor Agricultural University "Human Ecology towards SDGs"

   Location: Bogor, Indonesia

   Date: 2 August 2016

   Presentation title: Environmental Services as an Alternative Livelihood Strategy in Rural Indonesia: Analysis Livelihood Transformation in Merabu Village, East Kalimantan

2. Poster Presenter on IUFRO International and Multi-disciplinary Scientific Conference "Forest-related policy and governance: Analyses in the environmental social sciences"

   Location: Bogor, Indonesia

   Date: 4-7 October 2016

   Presentation title: The End of The Last Hunter-Gatherers in Kalimantan: Analysis of Changes in Forest Area and The Transformation of Livelihoods System

**Abstract**

Forest for the hunter-gatherers community is not only being one of the livelihood assets but creates an ethical and moral typical production embodied in the type of mode of production. Changes in forest areas will encourage the emergence of community livelihood systems transformation. Dayak Punan tribe as hunter-gatherers communities go through turbulence in their livelihood system when an access to forest is increasingly limited. Based on a case study at five Dayak Punan communities at Berau District, East Kalimantan using qualitative and quantitative approach, slowly but surely the existence of hunter-gatherers communities will ends. Resettlement, the expansion of large-scale economic activity and community empowerment program serves as the driving factor that alters the dominance of forest income to new sources of livelihood (livelihood diversification strategies). The transformation of livelihoods is not only providing the chance of hunter-gatherers communities to get a better life, but also open the opportunity of a gap in the community. The work base of egalitarian group in hunter-gatherers communities are replaced by more formal and structured new institutions, that provide an opportunity for a small portion of the community member to get more profit while most members of other community still struggle to preserve their life.

***Key word:*** *hunter-gatherers communities, livelihood assets, Dayak Punan, transformation of livelihoods, livelihood diversification strategies,*

3. Presenter on the 4th International Conference on Research for Development (ICRD) "Evidence, Engagement, Policies Research for Sustainable Development"

   Location: Bern, Switzerland,

   Date: 5–8 September 2017

   Presentation title: From Hunting-gathering to Industrial Economy: Analysis of Livelihoods Change of Punan Dayak Communities in East Kalimantan, Indonesia

**Abstract**

Rural communities generally depend their livelihoods from natural resources by hunting-gathering activities, as Punan Dayak communities did in Kalimantan. However, the dynamics of economic development has, slowly but surely, resulted in dramatic social change of rural communities. Punan Dayak communities is without no exception also undergoing dramatic change, particularly its livelihoods system. The change began short after the resettlement program that was promoted by the government. They gradually put themselves as sedentary fallow farming system, forest-resources extraction activities are still obvious though its role became very insignificant. Recent NGO report confirmed that the states of economic situation of Punan Dayak communities has gradually change to become socio-economically critical and marginalized. The available livelihood sources have become very limited to the communities. Simultaneously, serious deforestation and forest degradation hits the communities as large-scale agricultural enterprises came to invest and expand their capital in the region, has also brought about loss of traditional livelihoods sources from the forest. It is important to mention that the development of oil palm plantation drove land use change that made the livelihood system of indigenous communities has been totally altered and devastated. With these changes, Punan Dayak communities are forced to face with other option of livelihoods strategist and finding out new sources of livelihood sources to survive. The problem is, not all alternative sources of livelihood are easily available, as well as accessible to them. Even if they are accessible, the limited number of sources of livelihood has made the quality of their livelihood resilience and sustainability can no longer as good as in the past. This condition occurs in two types of Punan Dayak communities in BerauDistrict of East Kalimantan Province of Indonesia. Two villages that are in common of origin and are located side by side, are compared. The research showed a very surprising result where the livelihood choice is absolutely different. They also implement different livelihood strategies. Their interest to land resources are also different. One community is very aggressive of occupying land where the other community is rather conservative in land occupation. This has then led to the agrarian-tenurial conflict as their expressions of controlling the land are

different. The Punan Dayak Community of Merabu Village choose to maintain forest land as the main income source by developing rural ecotourism business while maintaining traditional farming system. On the contrary, Punan Dayak Community of Merapun Village choose to receive investments of oil palm plantation companies and become plasma of the company's nucleus-plasma partnership scheme. Most of them are encouraged to work as formal laborers in the plantations. The intervention from other actors from public, private and NGO is the other typical and important characteristic of this community. The role of customary institutions determining land use has also change, dramatically. The role of local institutions are paralyzed gradually somehow. That is what happened in two Punan Daayak communities that have chosen two different livelihood strategies due to the arrival of modernities development and economic development activities in the region.

***Key words:*** *livelihoods strategies, livelihood sustainability, local institution, ecotourism, oil palm plantation*

## FURTHER ACTIVITY

1. PhD Seminar (November-December 2017)
2. Submitting National and International Journals (December 2017 –January 2018)
3. PhD Final Exam (February 2018)

## GENDER ASPECTS OF FOREST ACCESS AND ITS IMPLICATIONS FOR REDD+: A CASE STUDY FROM CENTRAL HIGHLANDS, VIETNAM

**Hao Phan**
*School of International Development, University of East Anglia*
*Supervised by: Dr. Catherine Locke and Professor Roger Few*

### Abstract

REDD+ (Reducing Emissions from Deforestation and Forest Degradation) specifically aims at combating deforestation and promoting sustainable forest management in developing countries. Concerns about REDD+ have been largely central around potential social impacts of REDD+ on indigenous rights over land and forest as well as their participation in REDD+ planning and implementing process. Gender considerations in REDD+, therefore, are almost invisible. Also, little is known about how REDD+ interacts with the existing institutions at national and local levels in shaping local access to forest and how these processes are gendered, especially for matrilineal societies where women's relations to productive resources are often not seen as being as exclusive as those in patrilineal ones (Villamor et al. 2015).

This research presents an ethnographic study on how Kala Tongu village, a matrilineal-based community in Central Highlands of Vietnam, uses and manages its natural resources. More specifically, it documents how local people employ different strategies to build their access to land and forest, develop their household livelihoods and respond to state-sponsored development projects from a gender perspective. By doing so, it unfolds the socio-cultural interpretation of forest and everyday politics of benefit distribution within an upland village selected to participate in various global and national forest protection and development programs. It also seeks to ethnographically examine the politics of designing and implementing forest projects from national to local institutions and the negotiations among involved actors regarding how gender considerations in REDD+ should be addressed to ensure its compliance to global norms.

To address the complexity of the chosen topic and case study, I employ Feminist Political Ecology (Rocheleau et al. 1996) and Ribot and Peluso's (2003) concept of access as a theoretical lens. Empirical data was collected through a twelve month field

work in Lam Dong Province and Hanoi using interview and other qualitative-based methods such as participant observation, life histories and photovoice with local people, government officers and NGO practitioners.

My empirical data suggest that ethnic communities in Vietnam should not be seen as homogeneous since the extent to which each individual manages to benefit from natural and social resources including forestry projects is conditioned upon their gender, ethnicity, age, and social status. For example, an individual is able to access to land, forest and state transfers by virtue of being male/female in a matrilineal society, ethnic minorities or Kinh people, senior or young member of the community and having or not having any sort of political connection with powerful people at local level. The differentiating strategies employed by Kala Tongu villagers, regardless of who they are, show that ethnic communities are not passive participants of state intervention initiatives. Instead, they actively engage in an on-going negotiation process with the Vietnamese government either through their 'everyday politics' or through additional formalised institutions set up by recent environmental projects (including PES and REDD+) to maintain and more importantly, to extend their access to resources. Specifically, the visibility of ethnic women in this negotiation process, as shown in my thesis, suggests that these local struggles to access to resources are also gendered, especially in matrilineal societies where women's status is closely linked to productive resources such as wet rice field, home gardens and later, coffee land.

Women's participation in the struggles to access to resources in the village, meanwhile, is interpreted differently at national level especially in the context of REDD+. As observed from my case study, it seems that from the perspective of policy makers in Vietnam, the active participation of ethnic women in everyday struggles to gain access to resources in pilot project sites means that gender equity in REDD+ is partly addressed. Therefore, according to them, gender equity should not be a priority agenda in the Readiness Stage of REDD+. The tendency to undermine gender issues at national level can also be attributed to the lack of clarity regarding how to translate gender equity in REDD+ from global documents to national policies and actual projects at local level. It is apparent that both the miscommunication from global to national level and the misrepresentation of gendered workings of REDD+ on the ground contribute to downplaying the importance of gender considerations in REDD+ design and implementation in Vietnam.

While this research largely focuses on gender workings of REDD+, it also aims to highlight the mismatch of forest governance structures in Vietnam and potential implications for REDD+. It is likely that this global environment project might sharpen the gap between the ethnic minorities and the majority group and even within local

communities regarding who should be entitled to what. In the case of Kala Tongu village, the ethnic minorities are expected to be the main target of environmental projects and therefore receive more benefit than the majority group (Kinh people). However, the lack of necessary means such as capital and politico-social connection, the complication of projects' design and implementation at local level and the possibility of access to alternative sources of socio-economic supports (i.e. loan from Kinh money lenders), in most cases, prevent ethnic minorities communities from materialising these benefit. The social differentiation between the two groups: local indigenous but poorer versus migrant but often better-off might render the conflicts more severe. These conflicts, on the one hand, are gendered as it reproduces the social stereotypes of matrilineal groups as backward, primitive, in need of being replaced by a modern and economically-sound patrilineal systems of social organisation (as in the majority group).These conflicts, on the other hand, trigger other forms of conflicts within the ethnic minorities community itself as the poorer are seeing themselves as double exploited and often blame the direct implementers of project such as the headman and other members of village-based forest management committee.

***Keywords:*** *gender, access to natural resources, Feminist Political Ecology*

# QUALITY OF FOLK SPECIES IDENTIFICATIONS AND THE EFFECT OF SAMPLING OF STUDY SITES, INFORMANTS AND TREES

**Søren Brofeldt*, Nerea Turreira-García*, Henrik Meilby, Martin Reinhardt Nielsen, Deden Girmansyah, Do Thi Xuyen, Iskandar Z. Siregar, Nguyen Lam, Ida Theilade**

**Co-lead authors*

**Acknowledgements**

We are grateful to the people from Ban Duong and Long Duhung for their hospitality and for sharing their knowledge and time with us. This project has been a joint collaboration between the University of Copenhagen (UCPH), the Vietnam National University of Agriculture (VNUA) and Bogor Agricultural University (IPB), funded by the FFU project (DFC No 13-08KU).

**Abstract**

While local ecological knowledge (LEK) is increasingly being used for biodiversity monitoring, a number of factors influence the quality of the field identifications provided by local informants and hence, our ability to translate between folk and scientific taxonomies. The aim of this study was to test how site, informant's profile and tree characteristics affect the consistency of folk identifications and our ability to establish the correspondence between folk and scientific taxonomies. We selected 7 and 21 informants in two villages with different livelihood strategies and access to the forest and carried out *in situ* identifications of trees in each site. We used quantitative data analysis to determine factors affecting identification rate and consistency for individual trees, species and families and we used taxonomical correspondence matrices to assess the correspondence between the Linnaean and the local taxonomies.

The informants from the village with higher access and use of the forest and further distance to market were significantly more consistent in their identifications than the ones from the agriculture-based village with restrictions placed on their use of trees. In both sites, older informants and informants who actively used trees had higher probabilities of proposing identifications. Active use of the species also improved the consistency of identifications and landmark trees and trees with a higher number of characteristics used in identification, were significantly more likely to be consistently identified.

Morphological and anatomical characteristics of certain families, such as Myristicaceae, Sapotaceae and Anacardiaceae influenced the identification consistency. The taxonomical correspondence matrices showed signs of both one-to-one

relationships, over-estimation and under-estimation. These findings contributes empirical evidence to inform research design and use of LEK in forest monitoring and caution that the use of key informants cannot necessarily mitigate the effect of site specific differences in LEK.

***Key words:*** *Local Ecological Knowledge, Ethnobotany, Community Based Monitoring, Forests*

**ABSTRACT AND SUMMARIES FINAL WORKSHOP**
**REDD+: THE FOREST GRABS OF ALL TIMES?**

**Organizer: Vietnam National University of Agriculture (VNUA)**
**Location: ATS Hotel, 33B Pham Ngu Lao, Hoan Kiem, Hanoi**
**Date: 16 November, 2017**

## WELCOME SPEECH

**Prof.Dr. Tran Duc Vien**
*Chair, University Council,*
*Vietnam National University of Agriculture*

Distinguished Guests

Dear Ms.Tran Diem Lan, Vice-Head, ICD, International collaboration department, MARD

Dr.Ida Theilade, the project coordinator

Dear participants and colleagues:

On behalf of Vietnam National University of Agriculture, I would like to welcome you all to participate in the final Workshop on REDD+(Reduced Emissions from Deforestation and forest Degradation): the forest grabs of all times. The objective of this workshop aims to demonstrate our research results on REDD$^{+}$: social safeguard issues and scientific papers based on PhD works.

In this great event, I would like to take this opportunity to thanks all of you for your participations, especially partners of this project: Institute of Food and Resource Economics (University of Copenhagen), Roskilde University, Agricultural University of Bogor, Institute of Cultural Studies, University of East Anglia. I would like also to extend my sincere thanks to DANIDA supports to our university for 20 years, and their support today for this workshop event. Thanks to MARD for their strong support Vietnam National University of Agriculture for 60 years. Danish research institutions to collaborate with us for our capacity building and sharing experiences. Thanks to Faculty of Environment for organizing the workshop.

Vietnam government has a lot of efforts on forest management. That are very important as Vietnam has a lot of serious slash floods in the uplands in Lao Cai, Yen Bai and Son La April-May 2017, serious typhoon No.12 a week ago in Khanh Hoa, Quang Nam, Binh Dinh provinces. REDD+ is one of promising solutions for forest management at global scale. Vietnam and Indonesia are the first countries to implement pilot REDD project in Asia. A number of Workshops and conferences on REDD in Bangkok, Indonesia and Hanoi states on REDD management issues in term of technical and livelihood aspects from NGOs and State officers. Today, we will demonstrate interesting scientific research results that combining social and natural scientists from different countries such as Denmark, United Kingdom, Indonesia and Vietnam. 05 PhD students will have opportunity to present their in depth studies on how to improve REDD performance from local community perspectives, transparency and raising local people awareness.

I hope that the workshop results will help policy makers, local authorities, NGOs, Vietnam National University of Agriculture, and relevant institutions to recognize the importance of REDD+ implementation issues and its management in Vietnam and Indonesia. The works that we have done today will contribute a great effort to protect our environment and saving our future.

Finally, I wish you all, distinguished guests, participants present here today happiness, good health and great success in your works and our safety forest.

Thank you for your kind attention!

Tran Duc Vien, Ph.D

Professor,

Chair, University Council

Vietnam National University of Agriculture

## WELCOME REMARK

**Ms.Tran Diem Lan**
*Vice-Head, ICD*
*International collaboration department, MARD*

Distinguished Guests

Professor Tran Duc Vien, Chair, University Council, Vietnam National University of Agriculture

Dr.Ida Theilade, the project coordinator

Dear participants and colleagues:

On behalf of Ministry of Agriculture and Rural Development, I would like to welcome you all to participate in the final Workshop on REDD+(Reduced Emissions from Deforestation and forest Degradation): the forest grabs of all times. In this great event, I would like to take this opportunity to thanks all of you for your participations, especially partners of this project: Institute of Food and Resource Economics (University of Copenhagen), Roskilde University, Agricultural University of Bogor, Institute of Cultural Studies, University of East Anglia. I would like also to extend my sincere thanks to DANIDA supports to our university for 20 years, and their support today for this workshop event.

DANIDA has supported Vietnam National University of Agriculture (VNUA) since 1990's. DANIDA's Grant Projects are mostly on capacity building; strengthen institution in research and development in natural resources and environment.

- Upper watershed management in the Ca River Basin (1998-2000)
- USEPAM project (University support on Environmental Planning and Management) (2002-2006)
- Water competition (2007-2010)
- TOTEPAM project/DCE program (Training of Trainers on Environmental Planning and Management (2008-2012)
- I-REDD (Impact of REDD): (2011-2015)
- REDD+: The forest grabs of all times? (2013-2017)

I hope that participants will have an excellent discussion on research findings, which are great contribution to REED+ program in Vietnam and our National Forestry Strategy for the period 2006 – 2020 with the Decision No. 18/2007/QD-TTg, dated 5

February 2007. Finally, I wish workshop having great success and participants with happiness, good health.

Thank you for your attention!

Ms.Tran Diem Lan

Vice-Head, ICD

International collaboration department, MARD

## INTRODUCTION OF WORKSHOP PROGRAM

**Dr.Ida Theilade**
*Project coordinator*
*Institute of Food and Natural Resource Economics*

Good morning,

On behalf of the Project: REDD+; the forest grab of all times? - I would like to welcome you to this seminar on REDD+

A special warm welcome to:

The Ministry of Agriculture and Rural Development

The REDD Agency of Vietnam

Participants from the Vietnam National University of Agriculture

It is very nice to see you all here today.

First, a few words about the background for this project:

REDD+ has emerged as a global initiative, with the key objective to reduce greenhouse gas emission from the forest sector. It aims to halt deforestation and forest degradation and to promote forest conservation by offering financial incentives to governments in developing countries.

These financial incentives include compensations for those who lose access to forest products and lands, and rewards for those who increase forest carbon. As such, REDD+ has received interest as a potential source of international funding.

To date, more than 40 countries have initiated REDD+ related activities.

However, there are growing concerns over the possible negative effects of REDD+ for millions of rural poor who depend on forests for subsistence and cash income as well as for their spiritual and cultural well-being.

Hence, the project's objectives are:

1. To strengthen the capacity of universities to conduct research on rights in relation to REDD+.

2. To generate insights into mechanisms to safeguard local people's rights in relation to REDD+ by investigating:

a. Governance

b. Whether community based monitoring of carbon, biodiversity, and livelihoods can improve local forest rights?

Our hypothesis is that REDD+ may violate customary rights to forests in situations of unclear property rights and may lead to inequality at the local level despite official social safeguards.

We also believe that community monitoring can support local decision-making processes in the interest of the communities, and that information gathered by communities can feed into national monitoring systems required according to the agreements of the UNFCCC.

With the project, we hope to generate insights on the effect of REDD+ on land rights, resource access and benefit distribution.

We hope to demonstrate under what circumstances social safeguards actually manage to secure rights and prevent REDD+ from becoming the forest grab of all times.

We hope that our results will support evidence-based decision making at national level as well as at the COP negotiations of the UNFCCC.

**Today's program consists of four sections**

**Section 1: REDD+ Governance and Policies**

**Section 2: Farmer's response to REDD+**

**Section 3: Does REDD+ and forest plantation programs enhance local livelihood**

**Section 4: Investigates community monitoring of biodiversity**

I hope you will find the results useful and wish you all an enjoyable day.

Thank you!

## SECTION 3: REDD+ GOVERNANCE AND POLICY

**Chairs: Dr. Thorkil and Dr. Ole**
*Roskilde University, Denmark*

## SUMMARY

This section presents REDD implementation with different contexts in Vietnam and Indonesia, policy supports, analysis of challenges and constraints for UN-REDD program, and primary suggestions to cope with these problems.

# MESO-LEVEL NEGOTIATIONS: A MISSING LINK IN UNDERSTANDING THE INTERPLAY BETWEEN REDD+ AND WIDER FOREST GOVERNANCE IN VIETNAM?

**Professor Roger Few** *(UEA)*
**Dr Catherine Locke** *(UEA)*
**Dr Cam Hoang** *(ICS)*

## Abstract

At a country level the politics of REDD+ implementation are shaped amongst many other factors by the interplay between REDD+ and existing systems of forest governance and the historically-specific bricolage of formal and informal rights over forests and/or lands designated as forests. In Vietnam, as in many contexts, existing forest governance is complex and involves different stakeholders at different levels including importantly international donors, local NGOs and commercial forestry interests. At the local level in Vietnam, the bricolage of rights is complex and includes community forests, PES initiatives and forest company leases, all overlain on 'official' categorisations of forest land that are incompletely imposed over much older customary practices of often varied ethnic groups. The way in which REDD+ processes interact with these relations of governance and tenures impacts on how it impinges on local people's control over forest resources and their gains from forest resources. In particular, it affects how far REDD+ enables local people to extend their control over increasingly valuable forests or, conversely, how far it allows for elite capture of financial incentives.

Meso-level processes, power relations and politics are central to shaping where precisely REDD+ is piloted/implemented and how commune and village level negotiations situate forest/forest land designated for REDD+ amongst existing local tenures over trees, forests, and forest land. These processes centre on the Provincial and Commune levels and their interfaces with national level and village level. Although they centre on the formal institutions of forest governance and their actors, these processes also extend outwards to involve other interests and actors, including national security concerns, commercial forestry interests and ethnic minority land claims. The negotiations between these stakeholders over REDD+ are only partially visible: what goes on explicitly in forums officially designated for forest governance is part of the story, but what goes on implicitly and behind closed doors is rarely transparent. However, their outworkings are manifest though in resulting decisions about where REDD+ is to be implemented and how it is to be implemented. For example, Sikor and Hoang Cam (2016)'s study showed how a REDD+ pilot run by an NGO (pseudonym

Verda) served the consolidation and extension of state authority in a commune they call Linh Bong (also a pseudonym). Here intense negotiations led to Verda supporting the allocation of stony ground without tree cover, which is unsuitable for afforestation, as REDD+ forest. This outcome arose from the need to avoid politically sensitive alternatives, reluctance to back the claims of the Dao to their customary forests, and concern to avoid challenging the Dao's conversion of state forest land to cultivation.

This research intends to draw together what has been learnt about the interplay of these factors within Vietnam by focusing on *the meso-level* of REDD+ practice. We intend to do this through review of existing secondary literature, by drawing on new research emerging from the Forest Grabs Research Consortium, particularly the work in Lam Dong, and through a limited number of key informant interviews in Lao Cai. The Readiness Stage involved piloting REDD+ at a restricted number of sights, some of which have been studied by the Forest Grabs Consortium, and the Implementation Stage has involved the selection of further sites, including those in Lao Cai. We intend to interview key informants at the Provincial, commune and village level in Lao Cai in order to build up a set of accounts about these processes, the considerations involved and their implications. We intend that this short but complementary research will provide an impression of how meso-level processes in Lao Cai compare with those experienced in Lam Dong.

***Key-words:*** *Multi-level Challenges, Meso level, REDD implementation*

**Piloting REDD+ in the context of existing forest governance**

- Piloting of REDD+ is shaped by the interplay between REDD+ and existing systems of forest governance and the historically-specific bricolage of formal and informal rights over forests and/or lands designated as forests.
- Existing forest governance in Vietnam is complex and involves different stakeholders at different levels including importantly government bodies (ministries and people's committee's at different levels), international donors, CSOs, business sectors (forestry and non-forestry companies), local NGOs and even media interests.
- At the local level, the 'bricolage' of rights includes community forests, PES initiatives and forest company leases, all overlain on 'official' categorisations of forest land that are incompletely imposed over much older customary practices of often varied ethnic groups.
- => interplay between these impacts on how REDD+ impinges on local people's control over forest resources and their gains from forest resources. In particular, it affects how far REDD+ enables local people to extend their control over

increasingly valuable forests or, conversely, how far it allows for elite capture of financial incentives.

**Meso-level processes, power relations and politics**

- Central to shaping where precisely REDD+ is piloted/implemented and how commune and village level negotiations situate forest/forest land designated for REDD+ amongst existing local tenures over trees, forests, and forest land.
- These processes centre on the formal institutions of forest governance and their key actors, namely Provincial, District and Commune levels and their interfaces upwards with national level and downwards village level.
- But they also extend outwards to involve other interests and actors, including national security concerns, commercial forestry interests, NGOs and CSOs and ethnic minority land claims.
- After REDD+ reviewed, REDD+ coordination committees established at Provincial and District levels, linked to the national level REDD+ Committee, with a view to improving multi-sector coordination as well as vertical communication.

**Research Design**

- Research Question: How do meso-level negotiations impact on piloting REDD+?
    - How are norms about REDD+ (its principals, objectives, and safeguarding) understood by different meso-level actors in forest governance?
    - What is being piloted by REDD+ at the meso-level? How is REDD+ changing forest governance and its incentives at the meso-level? What is REDD+ being used for by meso-level actors in forest governance?
    - How does the handling of REDD+ (with attention to issues around information, representation and recognition) at the meso-level influence what happens at the local level and what happens at the national level?
- Research Methodology:
    - Ongoing review of existing secondary literature
    - drawing on new research emerging from the Forest Grabs Research Consortium, particularly that in Lam Dong by Dr Cam and Ms Hao
    - Short but complementary fieldwork in Lao Cai.
- Fieldwork In Lao Cai
    - Interview key informants at the Provincial, district , commune and village level in Lao Cai in order to build up a set of accounts about

REDD+ and forest governance. Team of 3 interviews (Few, Locke and Hoang) working with 2 translators for a week.

- Research Output
    - A co-authored paper between UEA and ICS on meso-level negotiations for a refereed journal.

**Research Challenges**

- Negotiations between these stakeholders over REDD+ are only partially visible:
- what goes on explicitly in forums officially designated for forest governance is *part* of the story, but what goes on implicitly and behind closed doors is rarely transparent.
- Key informants are likely to be *strategic* about what they share with us in interviews about the workings of REDD+ and forest governance => we have to treat this data as revealing of the impression that our interviewees would like to promote about REDD+ (from a social science perspective, as narrative rather than 'truth').
- However, the *outworkings* of these meso-level negotiations are manifest though in resulting decisions about where REDD+ is to be implemented and how it is to be implemented =>we can to some extent mobilise village-level findings about how extra-village interests that have shaped REDD+ to infer what is happening at the meso-level.

**What do we know so far?**

- Lam Dong province keen to take on REDD+ pilot and able to match funds because of its forest revenues. Pilot villages selected were those with fewer conflicts and with existing 'success' in PES initiatives. Throughout Vietnam, REDD+ is mostly piloted where PES or community forestry schemes exist. => Why were specific sites selected and how do these selections address the interests of different actors and their understanding of what REDD+ is about?
- REDD+ 'piggybacked' on to existing forest governance mechanisms and especially PES. This lowers transaction costs of pilot by working with villages where there is already a 'working relationship' => What are the core features of that 'working relationship' and whose interests do they serve?
- The evidence on how PES and REDD+ functions suggests that 'participation' is often whole-village consultation but that more authority rests with the village-level forest protection committee in negotiation with the Commune People's Committee as well as local SFE's => Where does real authority lie in shaping what happens at the village level?

- Unclear what value REDD+ pilots are adding either in terms of more of better forest protection, improving the lives of forest dwellers, or transforming forest governance => How far is REDD+ increasing or substituting resources for 'business as usual' at different levels?
- Appears that REDD+ has generally not led to changes in forest tenures, nor taken a whole landscape approach, but that expectations around REDD+ may be revitalising claims to customary lands and risk intensifying conflict over forests/forest lands as well as creating resentments at SFEs that may hold leases to land allocated for REDD+ => How far do different REDD+ stakeholders at the meso-level perceive REDD+ objectives with respect to questions of tenure and management?

**Empirical Clues?**

- **Sikor and Hoang Cam (2016)'s study** of REDD+ pilot run by an NGO (pseudonym Verda) in a commune they call Linh Bong (also a pseudonym). Their findings showed that the consolidation and extension of state authority through REDD+ pilot.
- Intense negotiations between Verda, government officials and the private company eventually led Verda to support the allocation of stony ground that was largely without tree cover, which is largely unsuitable for afforestation, as REDD+ forest . A dense patch of forest cover that the local Dao regarded as theirs but which had been allocated to a private company by the neighbouring Provincial People's Committee was left out of the agreement. This dispute was active at the time of REDD+ piloting and at one point this led to a violent confrontation between the Dao and the private company.
- A private FC, Verda, as well as Commune, District and Provincial People's Committees were key actors in these negotiations. Although the outworkings of these negotiations had concrete implications for the village, the negotiations themselves occurred at the meso-level.
- Verda were the drivers of implementation and used their authority to insist that all households, not just ethnic minority ones, were eligible for REDD+. This decision went against the preferences of the 'indigenous' ethnic minorities but accorded with VERDA's interpretation of the principles of REDD+. Verda refused to get involved in the claims of the Dao to their customary forest arguing that REDD+ criteria concerned forests that where there was clarity of tenure. The tenure for the rocky hills was allocated to ethnic minorities and other local communities who joined the self-management teams by the District People's Committee. This was facilitated by existing tenure arrangements that had placed the management of the rocky hills in the care of the Commune's People's

Committee. Since the rocky hills had no valuable forests, and little potential for afforestation, Verda used REDD+ resources to provide support for agriculture to the self-management teams and REDD+ was regarded locally by many as an agricultural extension project.

- This outcome arose from the need of meso-level actors to avoid politically sensitive alternatives, reluctance to back the claims of the Dao to their customary forests, and concern to avoid challenging the Dao's conversion of forest land to cultivation. The interplay of a complex and contested history of forest governance with REDD+ actors and norms led to this curious outcome.

**Evidence from Lam Dong**

Village A (Hao Phan's research site) K'ho village

- Land allocated for REDD+ is protection forest leased by SFE. Some villagers were paid guards.
- Now there is no payment for patrolling under REDD+ but this confers eligibility for community development funds (and theoretically for harvesting benefits in the longer term). REDD+ resources have *substituted* for payments by SFE.
- Appears that outcome strongly influenced by SFE which is a major owner of forests around the village. These leases are *not decided* at the village level and are ongoing and national policy currently bans logging on protected forest.
- Flow of resources for REDD+ tightly controlled by village head and Commune People's Committee. Most villagers have no idea about REDD+ and do not distinguish it from PES initiative. 'Participation' is *locked in* at the village level and there is no transparency or accountability at/beyond beyond village level. Appears that there are no changes in forest governance at meso-level.

**Village B (Cam Hoang's research site):** Mixed ethnicity but indigenous groups are K'ho and Ma.

- SFE allocated 50 year land-use certificate by Lam Dong Provincial People's Commune to protected forests around village (700 ha) in 2007. PES from 2008 operated by the SFE as well as REDD+ pilot since 2009 through its Forest Management Board (FMB). Patrolling groups are paid for patrolling from PES and receive access to REDD+ resources given as rotating loans to the groups. However, in 2012 the SFE cut down 3,000 blocks of trees against the will of the villagers and subsequently the areas has been closed by the Provincial authorities.
- Piggbacked on PES scheme, FMB has upper hand and resents REDD+ emphasis on participation, (forest as 'his own garden'). FMB excludes certain poor households (some K'ho and younger couples) and includes others who are not villagers (mostly Kinh). Households who are members of the patrolling groups – including senior

officers of these groups – are critical but reluctant to raise their concerns with higher level state authorities for fear of being excluded from the groups.

- K'ho had seen in REDD+ an opportunity to reassert their customary claims to forest. Local authorities have supported the FMB's dominance sidestep disputes between indigenous K'ho who wish to reclaim the forest as theirs and migrant Kinh and migrant ethnic minorities settled in the village who are resisting the exclusivity of their claim.
- => The 'working relationship' centres around the FMB and is been endorsed by local authorities –both Provincial People' Committee and Commune People's Committee.
- => REDD+ has intensified conflict of villagers with state and private sector - villagers understand REDD+ as opp. to claim land and FMB perceives participation as illegitimate.

**Tentative conclusions**

- REDD+ introduces new expectations and resources into the interplay of pre-existing forest governance and bricolage of tenures. In the absence of fundamental change in meso-level forest governance this is likely to either *shore up* existing power relations or to *intensify existing tensions*.
- Different understandings or interpretations of REDD+ goals by different actors at the meso-level are used to support negotiations around their respective interests. In particular, the interests and manoeuvrings of *forest companies* need more meso-level attention.
- Unclear what is being piloted at meso-level by REDD+. Grafting REDD+ on to existing channels for delivering PES and CF *insulates* meso-level forest governance from change.
- Neglect of meso-level power relations and negotiations means that 'participation' in REDD+ is *locked in* at the village level thus preserving or enhancing authority of local authorities (headmen and CPC) - no effective channels for upwards communication and/or mechanisms for downwards transparency and accountability for village to meso-level (and onwards to national level).
- Neglect of the reality of meso-level negotiations at the national level risks that national policy actors have expectations that cant be fulfilled without more fundamental change in forest governance across all levels. The fragmentation of REDD+ piloting - intended to ensure maximum experimentation and learning in the pilot phase – may be concealing how important it is for REDD+ to grasp the underlying conflicts over tenure and forest governance that animate meso-level negotiations and micro-level conflicts.

# MULTI-LEVEL CHALLENGES FOR REDD+ IMPLEMENTATION IN VIETNAM

**Thorkil Casse[1/], Zach Wurtzebach[1/], Martin R. Nielsen[2/], Henrik Meilby[2/], Anders Milhøj[2/]**

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The objective of this article is to analyze the REDD readiness process in Vietnam, with an eye to existing policy design choices and implementation challenges at international, national, and sub-national levels. We ask:

1) What are the barriers and challenges for implementing REDD+ in Vietnam? For the main findings we refer to the section: Explaining Challenges with REDD+ design and implementation in Vietnam.

2) What are the prospects for the future of the program?

A National Reduction Action Plan (NRAP) was developed in 2011, albeit without any consideration of cross-sectorial issues and essentially issue of statements of goals, with little detail on how these will be achieved. The government issued a new NRAP in 2017 in response to the challenges. However, it is too early to evaluate its potential for success.

We visited two provinces, Lam Dong in 2016 and Lao Cai in 2017 to investigate REDD+ implementation at the ground level. We saw only small signs of REDD+ activities, like awareness campaigns and a micro-finance schemes. Troubling was the observation in Lam Dong, villagers which benefitted from micro-loans perceived REDD+ most in contradiction to the REDD+ idea. Villagers believe they can exploit the forest as before. Most positive sign was a slowdown in deforestation rates around the involved villages. However, the short period of REDD+ activities, from 2015-2016 onwards, renders evaluation of REDD+ programs rather debatable.

Implementation of REDD+ in Vietnam has been complicated by policy design across macro, meso and micro levels of implementation. Outcomes are primarily defined in terms of very broad objectives, such as capacity building, international organizations can nonetheless point to the efforts as evidence of success. Goals associated with safeguards and stakeholder engagement are rarely mentioned in policy documents and controversial issues as conversion of natural forests to plantations, keeping the national forest cover constant, are presented as voluntary choices only. Indeed, procedural tools are not enough to ensure commitment, particularly if

substantive policy tools and the inherent tradeoffs associated with them have not been specified. Perhaps the readiness process should be judged not by the concrete results, but on the additional benefits it has brought to Vietnam through the focus on forest inventory, forest rights and possible future use of economic incentives for protection.

**Lost in implementation? REDD+ country experiences in Indonesia and Vietnam**

Authors: Thorkil Casse, Zach Wurtzebach, Martin R. Nielsen, Henrik Meilby, Anders Milhøj, Yanto Rochmayanto

The aim of this paper is to analyze the REDD+ track record in Indonesia and Vietnam from 2010 and to what extent the invested REDD+ efforts paid off in stabilizing the deforestation rates and/or to achieve the overall objectives of the REDD+ program.

In a global perspective, the clock has turned towards more critical assessments of the feasibility of REDD+. That being said, what differ often in the analyses are scale and type of challenges. To some observers, the challenges are of technical nature. International organizations should resolve technical obstacles such as representativeness of projects in case of up scaling to the national level and address how to reach climate efficiency, where REDD+ programs become permanent and leakage issues are solved.

Another school looks beyond the measuring issues and relates to forest definitions; by which forest in remote areas are classified as 'degraded' or low productivity forest. This in turn justifies whole-sale clearing of secondary and even primary forest and conversion to plantation purposes. Both in Indonesia and Vietnam, forest officials refer to the term of low productivity. Others again signal conservation fad and REDD+ becoming a discursive commodity in 'a moment in time when we cannot afford to waste financial resources on hot air'.

In contrast to the technical or conservation fad angles, we argue the major problem lies with the global governance model. Scholars have discussed the willingness of actors to involve in the REDD+ process. Based on interviews conducted with stakeholders, the authors observed resentment or discontent with the stakeholders and the anticipated inability of compensation to balance claims on foregone benefits from continuous exploitation.

Local villagers were never consulted before the pilot REDD projects arrived and they showed substantial hostility to the idea of no exploitation in case donors were not willing to transfer any compensation money. Limited forest exploitation and financial transfers made available directly to the end-users could be the way forward; however,

lukewarm developing country governments and paper like endorsements of REDD programs could well constitute the main obstacles for this ever to happen.

**Closing up or closing down on the results-based implementation phase?**

- FCPF (World Bank) comprises 47 countries and UN-REDD 74 countries. After nearly 10 years of discussion and 6 years of funding, 2 countries are on the edge to enter the implementation phase: Costa Rica and DRC.
- Back in 2012, the World Bank reported seven countries would soon reach the implementation phase (including Vietnam)
- From 2012 to 2016, optimism about rapid tangible results shifted to a risk assessment: will REDD+ only marginally alter a BAU emissions trajectory ? UNREDD and WB rephrase REDD+ objectives: A policy framework in its most optimistic version.

**Shifting donor darlings but where to go ?**

- In the early phase (2009-2012) of REDD+, UN-REDD and World Bank specified meso-level goals: identification of drivers of deforestation and development of potential performance based benefit distribution strategies
- By 2017, the Vietnamese government managed to list main drivers, though without any prioritization. A request for additional funding submitted to the World Bank was submitted in 2016. Acting on critical comments from a World Bank advisory board, the Vietnamese might submit a second draft of the request by December 2017.
- In Indonesia: tiny fragmented REDD+ projects concentrated in eastern Kalimantan. REDD+ and the fight against climate change not mentioned in any government policy paper. UNREDD brought an end to its activities, leaving the World Bank as the only major donor.

**Vietnam and the achievements (national level)**

- Four major interventions are yet to be finalized: the benefit-sharing mechanism, safeguards, an MRV system and a revised forest policy statement
- The Vietnamese government requested a *3 year extension* of the REDD + readiness phase 2015-2018. UNREDD might discontinue its activities beyond end of 2018, pending on a Norwegian decision.

**Vietnam and the achievements (provincial level)**

- Researchers visited 4 out of 6 REDD targeted provinces (Bac Kan, Ha Tinh, Lam Dong and Lao Cai)

- Qualitative interviews in the last two provinces + quantitative data collection
- Pilot projects are marginal in size and in one case build on existing and relatively well-functioning forest protection schemes
- When visiting the Lam Dong province, heralded as the most successful REDD province in the country, we saw no local REDD+ activities apart from a tiny and insignificant micro-finance scheme. In addition to local awareness raising activities and small reforestation initiatives.

**Indonesia, achievements, national level**

- Small activities of brokering local deals between villagers and logging companies in Kalimantan (The Nature Conservancy). Defining land rights is a major governance issue in Indonesia.
- No benefit sharing scheme is in place anywhere, but nearly 12% of Indonesia's forest areas have engaged in a REDD arrangement.
- After years of trials, all REDD+ activities are concentrated on Kalimantan. UN-REDD activities in Indonesia have ended.
- Authorities don't grant any new concessions to palm oil plantations (on paper, but…).
- REDD dialogue gives more clout to people locally, but no better forest protection is registered nationally. Norway has paid approx. 8% of its pledged grant of $ 1 billion to the Indonesian government only.

**Comprehension of REDD+, local attitude, Vietnam and Indonesia**

*Table 1: Crop farming legal or not under REDD+ regime, Vietnam*

| *Answers* | *Village* | | | |
|---|---|---|---|---|
| *Frequency, Pct* | *KaLaTanGu* | *Lao_Cai* | *R'teng 2* | *Total* |
| *Not allowed* | 57 | 44 | 72 | 173 |
| | 57.58 | 31.88 | 90.00 | |
| *Allowed some* | 4 | 19 | 2 | 25 |
| | 4.04 | 13.77 | 2.50 | |
| *Allowed freely* | 1 | 45 | 0 | 46 |
| | 1.01 | 32.61 | 0.00 | |
| *Don't know* | 37 | 30 | 6 | 73 |
| | 37.37 | 21.74 | 7.50 | |
| *Total* | 99 | 138 | 80 | 317 |

| *Table 2: Crop farming legal or not under REDD+ regime,Indonesia* | *Village* | | | |
|---|---|---|---|---|
| *Frequency, Pct* | *Birang* | *Merabu* | *Merapun* | *Total* |
| *Not allowed* | 7<br>22.58 | 15<br>53.57 | 20<br>24.10 | 42 |
| *Allowed some* | 3<br>9.68 | 2<br>7.14 | 1<br>1.20 | 6 |
| *Don't know* | 10<br>32.26 | 6<br>21.43 | 38<br>45.78 | 54 |
| *Don't understand* | 11<br>35.48 | 5<br>17.86 | 24<br>28.92 | 40 |
| *Total* | 31 | 28 | 83 | 142 |

**Indonesia/Vietnam and the local achievements**

- Only in already protected villages, people understand the concept of REDD+. In R'teng 2 (Vietnam) and Merabu (Indonesia).
- Asking the question if villagers expected to gain from REDD+, answers are very heterogeneous. No answers in Lam Dong, most say yes in Lao Cai (why ?) and very clear answers in Indonesia. People in Indonesia seem more knowledgeable about the idea of REDD+ than villagers in Vietnam. Note once again, the situation in Merabu, distinguished different from the other villages.

| **Benefits from REDD+, Indonesia** | | | | | | |
|---|---|---|---|---|---|---|
| | | Vilage Code | | | | |
| | | Merabu | Long Duhung | Merapun | Birang | Total |
| Benefit code | Yes, environment | 18 | 7 | 33 | 8 | 66 |
| | No | 5 | 1 | 15 | 3 | 24 |
| | Education | 1 | 1 | 2 | 2 | 6 |
| | Don't know | 11 | 9 | 33 | 12 | 65 |
| Total | | 35 | 18 | 83 | 25 | 161 |

**Willingness-to-Accept**

Please state the minimum annual compensation that you would require to enter into a contract requiring you to forgo the option of selling any timber from one hectare of old growth indigenous trees?

Whether a comparison among villages or countries is aimed at, the conclusion is surprisingly similar. In Indonesia, more people reject to answer than in Vietnam.

Talking about a government decision or a reference to preference for palm oil production.

| Table 3: Willingness-to-Accept amount, old forest by village, Lam Dong, Vietnam | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Scenario groups old forest | | | | Total |
| | | | 0-10 mio | 10-30 mio | 30-50 mio | Above 50 mio | |
| Village | DaChay | Count | 7 | 1 | 0 | 0 | 8 |
| | | % within Village | 87.5% | 12.5% | 0.0% | 0.0% | 100.0% |
| | KaLaTanGu | Count | 83 | 10 | 4 | 8 | 105 |
| | | % within Village | 79.0% | 9.5% | 3.8% | 7.6% | 100.0% |
| | R'teng 2 | Count | 82 | 8 | 3 | 8 | 101 |
| | | % within Village | 81.2% | 7.9% | 3.0% | 7.9% | 100.0% |
| Total | | Count | 172 | 19 | 7 | 16 | 214 |
| | | % within Village | 80.4% | 8.9% | 3.3% | 7.5% | 100.0% |

| Table 4: Willingness-to-Pay, old forest by village, Kalimantan, Indonesia | | | | | | |
|---|---|---|---|---|---|---|
| | | | Scenario 3, groups, old forest | | | Total |
| | | | 0-10 mio | 10-30 mio | 30-50 mio | |
| Village | Merabu | Count | 12 | 4 | 3 | 19 |
| | | % within Vilage | 63.2% | 21.1% | 15.8% | 100.0% |
| | Long Duhung | Count | 3 | 3 | 3 | 9 |
| | | % within Vilage | 33.3% | 33.3% | 33.3% | 100.0% |
| | Merapun | Count | 26 | 9 | 0 | 35 |
| | | % within Vilage | 74.3% | 25.7% | 0.0% | 100.0% |
| | Birang | Count | 8 | 5 | 1 | 14 |
| | | % within Vilage | 57.1% | 35.7% | 7.1% | 100.0% |
| Total | | Count | 49 | 21 | 7 | 77 |
| | | % within Vilage | 63.6% | 27.3% | 9.1% | 100.0% |

**Conclusion: REDD and global environmental governance**

- REDD+ readiness objectives were about capacity building and have placed a strong emphasis on procedural policy tools. International donors accepted leaving out the real goals on halting deforestation and promoting transparent governance.
- Indonesia and Vietnam are concerned with the donor community meddling with what they consider internal policy affairs. Not easy to compromise between a global commitment and a national sovereignty claim.
- Catch 22 situation? Funding first or commitment?

# DOES REDD+ COMPATIBLE WITH VIETNAM'S DEVELOPMENT POLICIES FOR THE HIGHLANDS?

**Associate Professor Ole Bruun**

*Roskilde University, Denmark*

## Description of work objectives, methods, and main results

My research efforts have primarily been oriented towards a) the socio-economic effects of REDD+ in the highlands, b) local governance structures in connection with REDD+, and c) the extent to which REDD+ initiatives at local level fit in with existing development policies for rural areas. Furthermore, the issue of perceptions of nature and environment in relation to REDD+ has been given some attention.

a) An first objective was the examine possible socioeconomic impacts of policies, investments and initiatives under the REDD+ program, such as increased income from forest protection payments or improved livelihoods from regenerated forest areas. However, since we are still in the stage of preparation or 'readiness' (Phase II) and no actual payments have yet been made to local households through benefit sharing mechanisms under REDD+, long term effects may only be surmised. Household surveys and interviews in Lam Dong and Lai Cai revealed that REDD+ programs mostly have had negligible impacts on local communities up until now, and that general awareness of REDD+ is equally low. However, funding made available directly to REDD+ programs at district level, such as in Lao Cai province, were seen to be allocated partly to developing new economic activities such as planting new valuable tree crops, thus potentially diversifying and improving the livelihoods of some local communities.

A vital aspect of highland development, which at the same time forms background for REDD+, is the economic marginalisation of ethnic minority people that has taken place during the reform period. Minorities now constitute by far the largest segment of poor people in Vietnam, and both surveys and interviewing confirmed their low level of existence and many challenges in life. One such challenge relates to the highland ecology, which has undergone a vast transformation process resulting in local people have lost access to forest products while depending on small paddy mono-cropping farms, often subject to grain diseases.

b) A range of talks and interviews with government officials at province, district and commune levels were conducted with the purpose of investigating how the REDD+ program is interpreted, administered and implemented at various levels. Though the national REDD+ program has a very complex management setup with several separate committees and organs, in which a range of stakeholders from both state and society are

participating, complexity decreases when descending down through administrative levels. At the local level (district and commune), REDD+ is exclusively managed by government, and none of the other national level stakeholders are active there. The district and commune level interaction between government and people is marked by top-down administrative structures, through which REDD+ is merely introduced to local communities in brief information meetings. Household surveys revealed the outcome of this form of administration to be that people are either unaware of REDD+ or show a low level of interest and participation.

Household surveys and interviews to a large extent confirmed what has been gathered from international literature, namely that REDD+ as a separate program has had little impact on the ground so far. A few newly designated demonstration forests seek to protect and upgrade heavily degraded forests, and a number of local people earn a little extra from serving in forest protection teams. Thus REDD+ merges with general Payments for Ecological Services (PES) activities organised by government.

c) In order to answer the question of how REDD+ fits in with existing government programs for rural development, several methods were used. Various state organisations and other stakeholder institutions in Hanoi were visited and interviewed, including the national REDD+ office, state forestry departments, national and international NGOs, and international donor organisations. Similarly, various levels of local government were interviewed. Finally, household surveys and interviews in Lao Cai were used to examine the real-life implications of REDD+ in relation to other government programs and policy areas. Starting from central level, it was the clear impression from both the national REDD+ office and national NGOs that a key area of interest for central government was to merge REDD+ with agro-forestry plantation development, continuing a decades-long policy of export-oriented economic growth and economic integration of the highlands. Interviews at lower levels of government confirmed that REDD+ initiatives generally fit in and are coordinated with other aspects of rural development, including new economic activities for livelihood diversification in the highlands. Most district government officials confirmed that REDD+ is fully integrated into existing policies and programs, such as the New Rural Development program, and subjected to economic growth and livelihood development priorities.

Thus a general finding from research is that REDD+ as a central government led program may contain new policy elements and experimental activities, but has not to any significant extent changed overall development priorities, at least at the present stage. Most efforts still go into increasing productivity and continuing a form of economic growth in the highlands, which historically has side-lined sustainability and conservation. Top-down administrative structures and a lack of non-state participation

at local level are barriers to introducing REDD+ as different from other government programs, to which people react in a foreseeable manner. Approaches to nature and environment, including forests, are similarly swathed in a sense of overall state ownership and control, which dampens the will to protect natural resources and biodiversity.

# STRATEGY FOR SUSTAINABLE FOREST RESOURCE AND ENVIRONMENT MANAGEMENT: A POLICY FRAMEWORK

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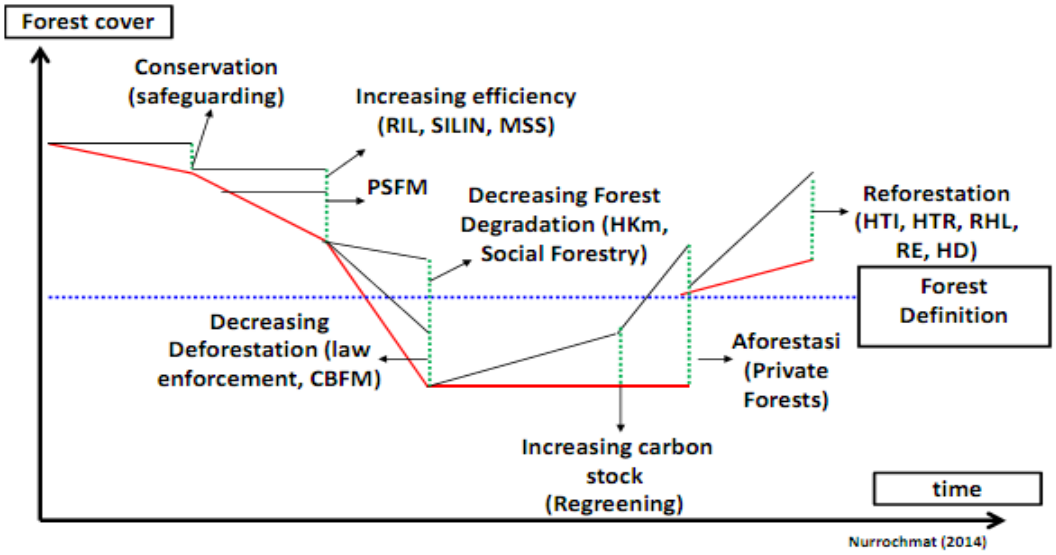
## REDD as part of Sustainable Forest Management

| Changes in: | Reduced negative change | Enhanced positive change |
|---|---|---|
| **Forest area (hectare)** | Avoided deforestation **RED** | Afforestation and reforestation (A/R) **CDM** |
| **Carbon density (carbon per hectare)** | Avoided degradation **REDD** | Forest restoration and rehabilitation (carbon stock enhancement) **REDD+** |

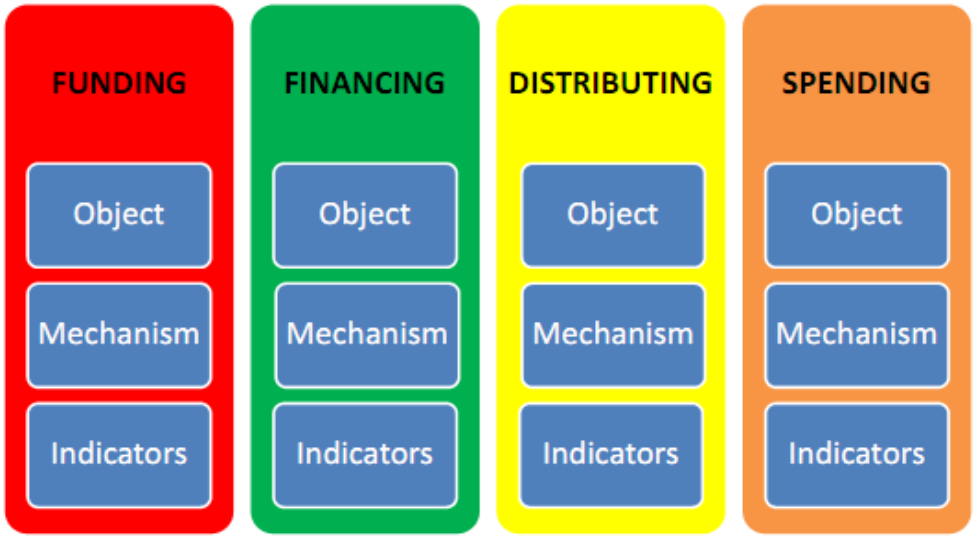
Source: adapted from Lasco, RD in Rodel (2009); DNPI (2010)

## The activities and dynamics of forest covers
(Nurrochmat 2014)

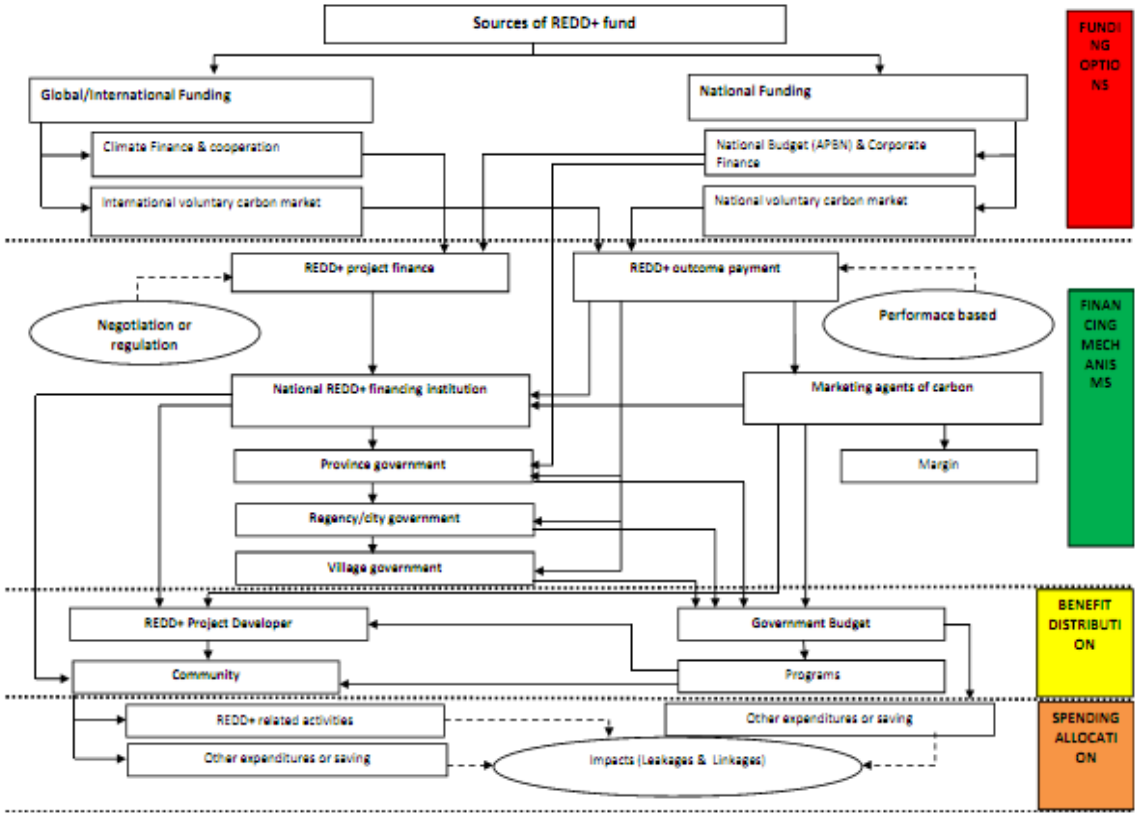


## Funding, Financing, Benefit distribution, and Spending of REDD+

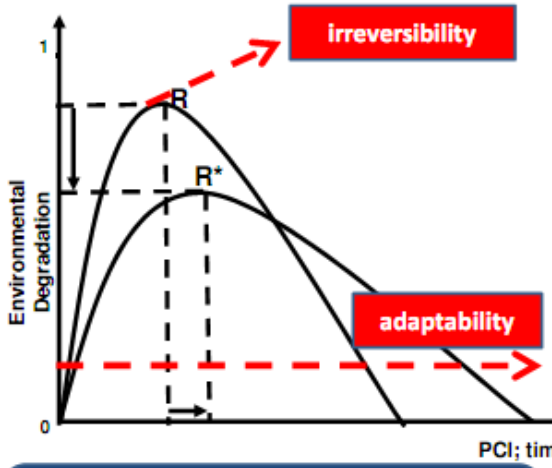
(Nurrochmat 2012)




### Framework of REDD+ Financial Scheme (Nurrochmat & Sulistyawati 2012)



# Sustainability Concepts




Sustaining the ecosystem function which allows the next generation enjoy the quality of live better than us. Each generation has own optimum ecosystem equilibrium.

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## Climate policy integration in the land use sector: Mitigation, adaptation and sustainable development linkages

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ABSTRACT

This article re-conceptualizes Climate Policy Integration (CPI) in the land use sector to highlight the need to assess the level of integration of mitigation and adaptation objectives and policies to minimize trade-offs and to exploit synergies. It suggests that effective CPI in the land use sector requires (i) internal climate policy coherence between mitigation and adaptation objectives and policies; ii) external climate policy coherence between climate change and development objectives; iii) vertical policy integration to mainstream climate change into sectoral policies and; iv) horizontal policy integration by overarching governance structures for cross-sectoral coordination. This framework is used to examine CPI in the land use sector of Indonesia. The findings indicate that adaptation actors and policies are the main advocates of internal policy coherence. External policy coherence between mitigation and development planning is called for, but remains to be operationalized. Bureaucratic politics has in turn undermined vertical and horizontal policy integration. Under these circumstances it is unlikely that the Indonesian bureaucracy can deliver strong coordinated action addressing climate change in the land use sector, unless sectoral ministries internalize a strong mandate on internal and external climate policy coherence and find ways to coordinate policy action effectively.



# Sustainability indicators

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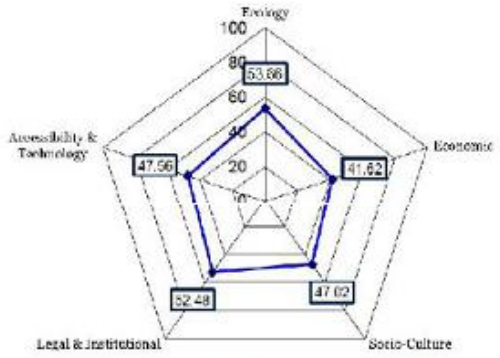


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## Evaluating the level of sustainability of privately managed forest in Bogor, Indonesia

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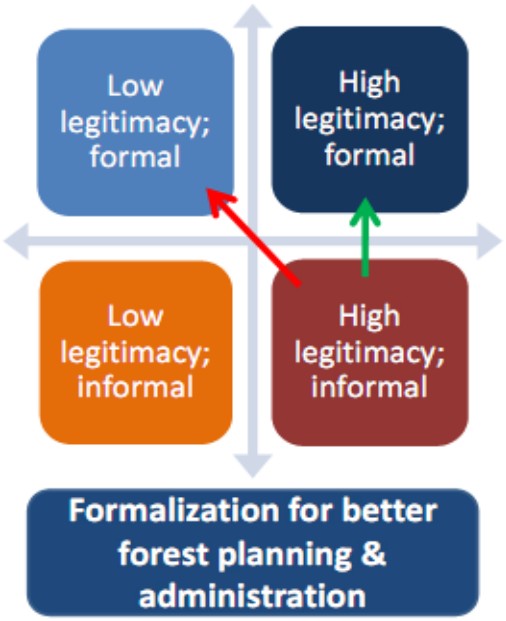
**Abstract** *Sukwika T, Darusman D, Kusmana C, Nurrochmat DR. 2016. Evaluating the level of sustainability of privately managed forest in Bogor, Indonesia. Biodiversitas 17: 241-248.* This study discusses the sustainability of small scale private forest in Bogor, Indonesia. It aims to determine the dimensions of sustainable private-forest and analyzing the sustainability index of privately managed forest. This study uses multidimensional scaling (MDS) to analyze the dimensions of sustainability, ranked from 0 (the lowest) to 10 (the highest), along with the support of *Rap-PForest*, in order to assess the level of similarity and dissimilarity for each dimension. Using this scale from the sustainability index, this study estimates the level of sustainability of each dimension. After measuring each attribute's level of sensitivity RMS change on the X axis, we estimate the the error's effect using Monte Carlo analysis. This study shows that the ecology as well as legal and institutional dimensions are moderately sustainable with a sustainability index of 53.66% and 52.48%. However, the dimensions of economy, socio-culture, as well asaccessibility and technology are less sustainable, with an index measurement of 41.62%, 47.02% and 47.56%, respectively. Based on these five sustainability dimensions, this study concludes that in average the level of sustainability of private-forest management in the Regents not sustainable (48.87%). We recommend that to improve the sustainability of small scale private forest management in Bogor, multiple stakeholders should be involved to development the most appropriate policy options.

**Keywords:** Bogor, Monte Carlo analysis, private-forest, RMS, small scale forestry, sustainability index

## Formality & Legitimacy




Regulation, formalization, and smallholder timber production in northern Central Java, Indonesia

James Thomas Erbaugh · Dodik Ridho Nurrochmat · Herry Purnomo

Abstract Forest Law Enforcement, Governance, and Trade agreements between the EU and countries that grow tropical timber aim to complement, alter, or generate new regulatory mechanisms that ensure the legality of timber products. These regulatory changes affect pre-existing policies and practices within timber production networks. The Indonesian EU Voluntary Partnership Agreement was signed in 2013, and legality verification is scheduled to become mandatory for all smallholders by the end of 2017. Using grower surveys conducted in the Jepara regency of Central Java (n = 204), we generate information on who Jepara smallholders are, what timber species they are growing, and how programs that provide free and discounted seedlings contribute to STP. We use these data to understand how STP operates and how Sistem Verifikasi Legalitas Kayu (SVLK), the Indonesian method for timber legality verification, will affect STP networks and producers. We find that resource provisions and oversight of source documentation increase formalization within STP. Our discussion details four policy-relevant insights for promoting STP amid continued formalization.

Keywords Forest policy · FLEGT · Timber legality verification · Smallholder timber production · Formalization · Java

Introduction

Forest legality verification represents the most recent in a line of initiatives to promote "good governance" of Indonesian production forests. In Indonesia, Reduced Impact Logging, the National Forest Programmes, and Integrated Conservation and Development Projects were implemented throughout the 1990s. Following these programs, often considered less than effective (Wells et al. 1999), non-state market driven (NSMD) certifications leveraged global markets and consumers to circumvent domestic institutions, implementing "good forest governance," as defined by third party certifiers (McDermott 2012). A long-standing complaint of many NSMD certifications is that comprehensive standards and implementation are not as widespread in the global south, restricting market access for tropical timber (Dieling and Yazid 2009; Marx and Cuypers 2010). Forest Law Enforcement, Governance and Trade (FLEGT) policies mean

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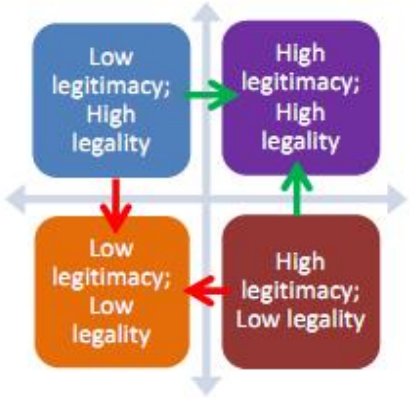
## Legality & Legitimacy




GLOBAL-NATIONAL-LOCAL FOREST REGIMES

ON FOREST & OFF FOREST

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Connecting national and international forest regimes: Case of timber legality certification for community forests in Central Java, Indonesia☆

Dodik Ridho Nurrochmat [a,*], Arya Hadi Dharmawan [b], Krystof Obidzinski [c], Ahmad Dermawan [c], James Thomas Erbaugh [d]

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Timber trade

ABSTRACT

The Government of Indonesia (GoI) and the European Union (EU) have signed a Voluntary Partnership Agreement on Forest Law Enforcement Governance and Trade (FLEGT-VPA), which aims to prevent illegal timber products from entering the EU. This agreement recognizes a certification for timber products exported from Indonesia based on FLEGT-VPA standards and implemented through the timber legality verification system, Sistem Verifikasi Legalitas Kayu (SVLK). While the implementation of SVLK complies with the FLEGT-VPA, it has not dissolved pre-existing national systems for forest management and timber trade. Implementing SVLK standards amid multiple forest regimes causes redundancy of administrative procedures in forest management and timber trade in Indonesia. This redundancy, in turn, lead to decrease in cost efficiency, weak legitimation, and low effectiveness of the system, especially in community forests.

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# Science based policy: a way to improve quality of policy

**WHY SCIENCE FAILED TO INFLUENCE POLICY?**


Sumber: Jones & Walsh (2008)

**Science policy interface is required**

Forest Policy and Economics 68 (2016) 23–29

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## The role of scientists in forest fire media discourse and its potential influence for policy-agenda setting in Indonesia☆

Meti Ekayani [a,*], Dodik Ridho Nurrochmat [b], Dudung Darusman [b]

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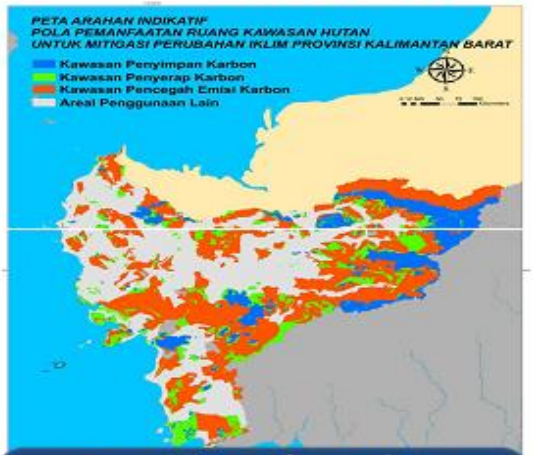
Knowledge utilization
Media discourse
Scientists' role

ABSTRACT

Forest fire is one of the most important issues discussed in international and national news media, because of its significant human and environmental impacts; these fires generate social, economic, and ecological problems that spread across national borders. Mediating these problems requires effective and applicable policy, formulated from a sound base of evidence. Thus, the quality of information is of primary importance in formulating appropriate forest fire combating policy. While the media is obligated to provide credible information, it often does so without scientific expertise. This study indicates that most interviewed stakeholders believe that scientists can deliver reliable information in policy agenda-setting, and therefore, the voices of scientists in the media have the potential to influence policy agenda-setting through their role as "issue advocates". This study, however, confirms that the news media does not recognize the knowledge of scientists as the most reliable reference in forest fire discourse. The weak "knowledge utilization" of news' substance is reflected in the minimal coverage of scientists in media discourses. This study examines the presentation of scientists in forest fire media discourse and stakeholders' perceptions of this presentation, in order to analyze the role of scientists in forest fire media discourse and its potential to influence and set policy agendas in Indonesia.



# Land use policy as basis for forest management




**Forest areas for carbon stocking, for carbon sequestration, and for avoiding carbon release**

Land Use Policy 49 (2015) 96–116

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Land Use Policy

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## The fragmented land use administration in Indonesia – Analysing bureaucratic responsibilities influencing tropical rainforest transformation systems

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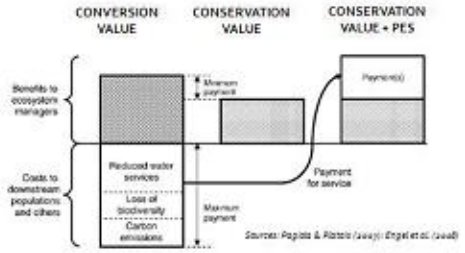
Dual system

ABSTRACT

Tropical forests in Indonesia are subject to major transformation processes from native forests to other land uses, including rubber agroforestry as well as rubber and oil palm plantation systems. Using content analysis of policy documents, this paper aims at (i) analysing the formal administrative responsibilities related to the four rainforest transformation systems and (ii) based on the informal matters of the competing bureaucracies involved generating hypotheses on their future course of action and related research. We find that based on the legal and political land use application, Indonesia's tropical rainforests may fall into six categories of land use. They may be situated in both, within the forest area and land outside of the forest area in so-called title forests, even though there is a though political debate about forest area category's jurisdiction confirmation. The Ministry of Forestry, the National Land Agency, and regional governments are identified as the core bureaucracies responsible in both forest area and title forest. The Ministry of Agriculture only has responsibilities in title forests. A number of secondary bureaucracies also steering forest transformation are identified. Formal responsibilities of these bureaucracies are highly complex and fragmented regarding the tasks of forest regulation, forest administration, forest management, forest protection, issuing forest management rights, issuing land rights, regulating and administering timber product, issuing licence, and regulating the commodity. Indonesian tropical rainforest is found to potentially transform into other land uses through seven steps: (i) releasing certain area from forest area, (ii) using forest area for non-forestry purposes (e.g. palm oil plantation), (iii) maximizing production forests for logging, (iv) developing community forest schemes in forest area, (v) developing plantation and agroforestry in title forest (vi) taking advantage from waste land, and (vii) reverting back to native forest. The intersection of responsibilities in steering rainforest transformation has created contestation between the bureaucracies involved. We conclude that the main conflict of interests runs between the core bureaucracies in this transformation, i.e. the Ministry of Forestry, the National Land Agency, and regional governments. The authors conclude with hypotheses on future actions of each bureaucracies in light of national and international influences on rainforest transformation systems. The central hypothesis contends that both core and secondary bureaucracies have conflicting interests over all four types of tropical rainforest transformation due to the areas of overlapping responsibility.

# Fiscal Policy as Sustainability Instrument

## PRINCIPLE OF GREEN FISCAL




KEYWORD: ENVIRONMENTAL SERVICES

**GREEN FISCAL POLICY = (1) Payment for Ecosystem Services (PES), (2) Liability Rule (LR) and (3) Purchasing Development Right (PDR)**


Forest Policy and Economics 61 (2015) 19–30

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### Redesigning Indonesian forest fiscal policy to support forest conservation


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Fiscal framework
Forest conservation
Forest revenue sharing
Gap analysis
Green fiscal policy



ABSTRACT

The formulation of fiscal policy in the forestry sector was designed as a green incentive for local governments to conserve forest area in Indonesia. However, evidence demonstrates an increasing rate of deforestation occurred during the implementation of fiscal policy reforms. Thus, problems persist in the implementation of fiscal policies in the forestry sector. This study evaluates the gap between the rule and the implementation of forest fiscal policy, focusing on regulatory, economic, administrative, and informational instruments. There are four main findings of this study. First, there are several inappropriate and even conflicting regulations concerning local government authorities and forest conservation; second, the lack of coordination among agencies is one of the most important factors causing sub-optimal collection of "non-tax state revenues" from the forestry sector; third, forest fiscal policies in Indonesia mostly focus on collecting financial benefit from timber rather than preserving ecosystem functions; and, fourth, there is a weak management information system concerning forest fiscal policy. To address the gaps identified in this study, the implementation of green fiscal policy in the forestry sector must provide a comprehensive regulatory framework and improve the capacity of human resources.




# Actor, Power, & Interests

BioPublisher

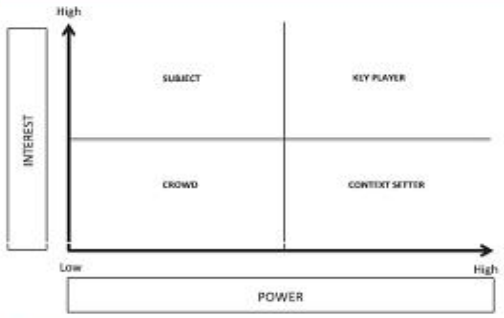


Fig.


International Journal of Marine Science 2014, Vol.4, No.16: 150-159
http://ijms.sophiapublisher.com

Research Report Open Access


### Actor, Interest and Conflict in Sustainable Mangrove Forest Management—A Case from Indonesia


Aulung Kustanti[1], Bramasto Nugroho[2], Cecep Kusmana[2], Dudung Darusman[2], Dodik Nurrochmat[2], Max Krott[3], Carsten Schusser[3]

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**Abstract** Mangrove forests in protected areas are common pool resources (CPRs). Characteristics of the forest resource is very dynamic, i.e. exposed to abrasion can be lost and could form areas with widespread forest land toward to the ocean. This phenomenon occurs virtually all coastal in Indonesia. It merits difficulties in determining policy granting ownership rights. The purpose of this study is to identify the role of stakeholders. We used the history description in period of 1977—2004 and analyses on the actors, interests, and conflicts in sustainable mangrove forest management in period of 2005—2010. In this research, we used the case study on the mangrove forest whose characteristic is emerging land, and the people were aware of not cutting forest for the other functions. Lampung Mangrove Center was chosen as a purposive sampling. Involving stakeholders in achieving the common goal of mangrove forest management is accordance with their duties and functions between the three partite cooperation (local government, community, and University of Lampung). The appearance of potential conflict that caused the same powerful interests among stakeholders should discuss to set the rules agreed upon. Interest in education of mangrove forest biodiversity in terms of their effects on the sustainability of non-timber forest products and fuel wood to meet the community household energy needs to enhance by the University of Lampung. The regulation governing the use of only dry branch of mangrove and not mangrove trees cutting is an effort to preserve the mangrove forests.



**Keywords:** Common pool resources; Three partite cooperation; Potential conflict; Forest biodiversity; Non-timber forest product; Household energy


**Concepts of power, actors, interests, influence**

# Policy Failures

**Causes of policy failures:**

(1) Bad policy – improper the substances of policy

(2) Bad execution – improper the implementation of policy

(3) Bad luck

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Scientific Article
ISSN: 2087-0469

**Changing policies over timber supply and its potential impacts to the furniture industries of Jepara, Indonesia**

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**Received March 2, 2015/Accepted April 28, 2015**

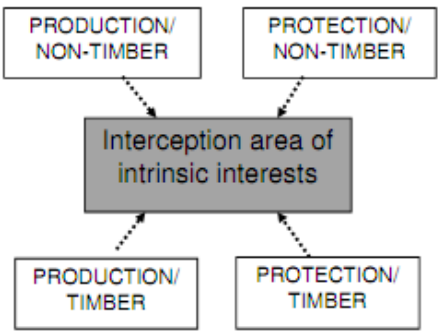
**Abstract**

*Though some scholars argue that Indonesian wood furniture industries are in decline, these industries remain a driving force for regional and national economies. Indonesian wood furniture has a long value chain, including: forest farmers, log traders, artisans, and furniture outlets. In Jepara, Central Java, wood furniture industries contain significant regional and historical importance. Jeparanese wood furniture industries demonstrated great resilience during the economic crisis in the late nineties. Although they were previously able to withstand the pressures of economic crisis, the enactment of Minister of Forestry Regulation (MoF or Reg.) 7/2009 on wood allocation for local use -as one of the implementing regulation of Decentralization Law 32/2004- causes a potential reduction of wood supply to Jepara. Since September 30th, 2014, however, the constellation of domestic timber politics has changed due to the new decentralization law (23/2014), which shifted most regulations on forest and forest products from the regency to the province. This study evaluates the dynamics of decentralization policy on timber allocation and examines the power of different stakeholders given the changing regulation and its consequences for Jeparanese wood production.*

*Keywords: decentralization policy, Jepara furniture, timber supply, wood allocation*

**Correspondence author, email: dnrochmat@yahoo.com; dnurochmat@ipb.ac.id, tel.: +62-251-8623805*

# Shifting contestation into cooperation




**Key factor for cooperation is finding the compatibility of substantial needs = interception of intrinsic interests**

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Forest Policy and Economics

journal homepage: www.elsevier.com/locate/forpol

Shifting contestation into cooperation: Strategy to incorporate different interest of actors in medicinal plants in Meru Betiri National Park, Indonesia

Dodik Ridho Nurrochmat[a,*], Ignatius Adi Nagroho[b], Hardjanto[b], Agus Purwadianto[c], Ahmad Maryudi[d], James Thomas Erbaugh[e]

ARTICLE INFO

ABSTRACT

**Bringing forest policy to the ground**

**FOREST DEVELOPMENT & ENVIRONMENT POLICY:**

**Theories and Practical Implementation**

## SECTION 4: FARMER'S RESPONSE TO REDD+

**Chairs: Dr. Ole Bruun[1/] & Dr. Hoang Cam[2/]**

*[1/]Roskilde University, Denmark*

*[2/]Institute for Cultural Studies*

SUMMARY

*This section presents how farmers response to REDD implementation process in Vietnam and Indonesia. Farmer attitude, perception on environmental payment services, forest protection program (patrolling, plantation), credit, livelihood improvement.*

## CAN PES AND REDD+ MATCH WILLINGNESS TO ACCEPT PAYMENTS IN CONTRACTS FOR REFORESTATION AND AVOIDED FOREST DEGRADATION

**By Martin Reinhardt Nielsen, IFRO**

The socioeconomic work package of the project encompass a number of different outcomes concerned with: 1) upland Vietnamese farmers willingness to engage in contracts requiring them to plant and conserve forest in REDD project assessed through contingent evaluation; 2) Vietnamese and Indonesian communities ability to evaluate household forest reliance and monitor trends in the welfare of community members providing a basis for negotiating compensation from REDD as well as development projects; 3) the impact of logging concessions on the livelihoods of indigenous communities in East Kalimantan; 4) the use of vegetation models to evaluate the role of large mammals in forest carbon cycles and the resulting consequence of defaunation; and 5) understanding utilitarian and hedonic values determining the demand for rhino horn in Vietnam in order to design optimally targeted consumer behavior modification campaigns.

Three of these manuscripts - involving various partners in the project as well as scientists outside the project - have been submitted to international peer reviewed scientific journals and are in various stages of the review process. The two remaining outputs are still in the analysis and write up phase. In addition to these outputs of the socioeconomic work package are a number of publications and draft by PhD students Dyah Ita Mardiyaningsih and Nguyen Hai Nui discussed in their own respect. Below is described in more detail the outline of a manuscript currently in review in the journal Conservation and Society the manuscript

**Title:** Can PES and REDD+ match Willingness To Accept payments in contracts for reforestation and avoided forest degradation? The case of farmers in upland Bac Kan, Vietnam.

**Authors:** Martin Reinhardt Nielsen, Ida Theilade, Henrik Meilby, Nguyen Hai Nui and Lam Nguyen.

REDD+ social safeguards promote improvement of local communities' livelihoods. However, the discussion on benefit sharing in the operationalization of REDD+ has largely focused on coefficients for differentiated distribution of available funds, whereas the question of economic incentives required to voluntarily establish and

maintain tree cover, has received limited attention. Using contingent evaluation, we elicit Willingness-To-Accept compensation for entering into contracts requiring farmers to 1) establish plantations, 2) abstain from logging these when mature and 3) refrain from cutting indigenous hardwood trees in Ba Be and Na Ri districts in Bac Kan province, Vietnam. We find average WTA payments ranging from 231 to 402 USD per ha, 256 to 414 USD $ha^{-1}year^{-1}$ and 387 to 594 USD $ha^{-1}year^{-1}$ in these three scenarios, with WTA payments significantly higher for households in Ba Be district, characterised as poorer in measures of financial and human capital, by better access to forest resources and therefore higher opportunity costs of establishing and maintaining standing forest cover than in Na Ri. Published estimates suggest typical payments of 38-43 USD per $ha^{-1}year^{-1}$ from PFES, REDD+ and government support combined and a one-off payment of 300 USD per ha from government reforestation schemes. Hence, the inability to match WTA levels suggests a bleak outlook for PFES or REDD+ projects aiming to comply with social safeguard measures to protect rural household welfare. However, we note that everyone in the sample was willing to engage in these contracts given compensation.

**Introduction – Problem Statement**

We have already talked a bit about REDD++ and how it aspires to reduce carbon emission by reduced deforestation and forest degradation through carbon trading schemes. Hence, given the REDD+ schemes **inherent confidence** in the **market**, it is critical to provide the **right economic incentives** through benefit-sharing systems. And well-designed and efficient benefit-sharing systems requires **engaging the right stakeholders**; determining the **appropriate forms and levels of incentives**; creating legal **benefit management mechanism**; enforcing **transparency**; and developing effective **dispute settlement mechanisms**. In fact the REDD+ Social and Environmental Standards (SES) covering all social and environmental elements of the "safeguards" agreed under the UNFCCC COP-16 in Cancun also requires REDD+ to **improve the long-term livelihood security** and **well-being** of local communities. However, the discussion on benefit-sharing in the **operationalization** of REDD+ has largely focused on what amount of surplus can be generated through forest conservation and **how the available amount** of funds are **to be distributed**. The question of what amount of financial incentives would **encourage** forest plot owners to plant trees **voluntarily** and abstain from logging, indicating that this would improve their wellbeing, has received only **limited attention**.

In Vietnam, efforts to operationalize REDD+ benefit-sharing mechanisms have

looked towards existing Payment for Forest Ecosystem Services (PFES) schemes and on-going government reforestation programs. Attention has focused on the **construction of coefficients** to differentiate **distribution** of available funds. In relation to PFES this is called **the K-factor**, which differentiates the amount of payment to forest owners **according to forest status, type of forest, origin of the forest and level of difficulty in forest management**. A similar factor, called the **R-coefficient**, has been developed to calculate the distribution of household level REDD+ payments. However, the economic incentives required by farmers to voluntarily establish plantations and maintain tree cover has not been rigorously addressed.

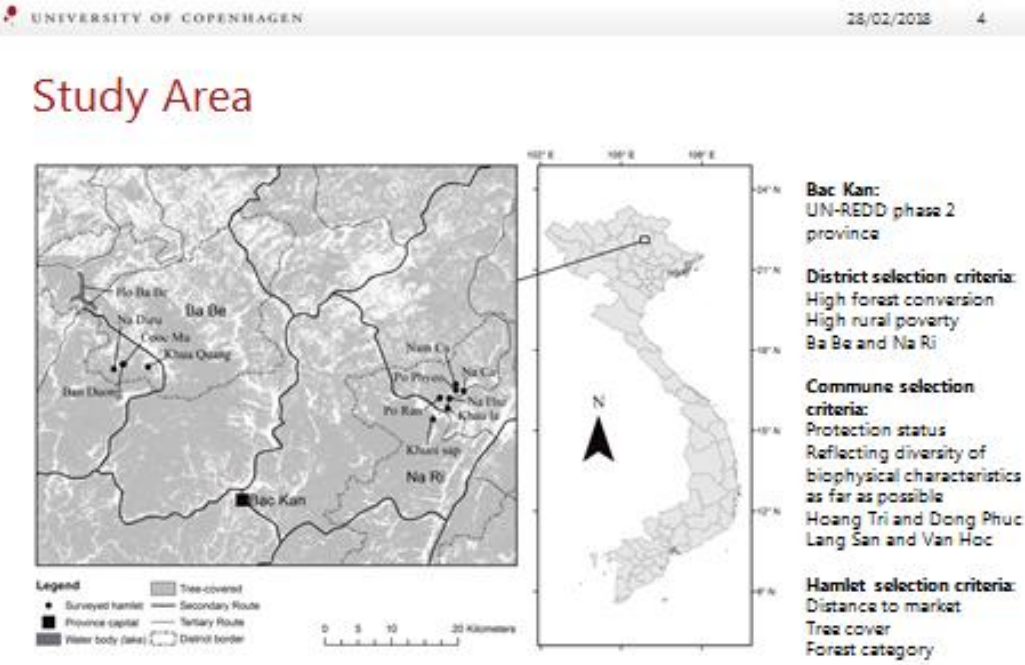
**Objectives**

Hence the objective of this study is, to assess household Willingness-To-Accept (WTA) payment for entering into contractual agreements (from here on simply WTA) requiring them to establish a plot of trees, abstain from logging mature trees, and refrain from logging indigenous hardwood tree species. **To elicit these measures** we use **contingent valuation methods** centred on the constructions of **hypothetical scenarios**. We then compare requested compensation to expected funds likely available for disbursement from PFES, REDD+ and government reforestation programs. Based on this we discuss the **feasibility** of these schemes in generating economic incentives for voluntary reforestation and avoided forest degradation.

**Study area**

We chose for this study the northern mountainous province of Bac Kan where **forest conversion** remains high in due to **shifting cultivation and logging**. Bac Kan is a prime target for development and implementation of **UN-REDD Phase 2** in Vietnam. Within Bac Kan we focus on Ba Be and Na Ri Districts that are considered hotspots for forest protection and rural development.

We conducted a household questionnaire survey in Ba Be and Na Ri Districts from March to May 2015 selecting **two communes in each district** based on distance to the National Park (in Ba Be) and forest cover. Hamlets, as the lowest administrative level, within communes were selected in the two districts based on distance to market, forest cover and category. Selection criteria were chosen to **reflect the diversity of biophysical characteristics** of communities in the province as far as possible. In Ba Be District, we selected Hoang Tri Commune located in the buffer zone of the national park, and Dong Phuc Commune at a further distance. In Na Ri District Lang San and Van Hoc Communes were selected.




Map of the study area with selected hamlets in Ba Be and Na Ri districts. Tree cover below 30% is white increasing in darkness until above 80% which is grey

**Data Collection**

Data collection took departure in **Circular** No: 21/2012/TT-MOLISA issued by the Ministry of Labour, Invalids and Social Affairs containing the **instructions for the annual investigation** identifying poor and near-poor households for issuing of **poverty certificates** to households falling below determined wealth criteria.

A questionnaire component was added to determine the magnitude of **compensation requested** by households for entering a **contractual agreement** requiring the household to: 1). Establish a plantation; 2). Abstain from logging a plantation, and; 3). Refrain from logging mature indigenous hardwood trees on their land. We framed the questions around a **hypothetical scenario** in which a **donor organisation** was planning to **invest in reforestation** in the area and was willing to compensate people for the costs of planting and maintaining tree cover. However, the donor was subject to a **budget constraint** forcing abandoning the project if the total demanded amount was higher than an **undisclosed maximum** (i.e. we introduced a **provision point mechanism** to reduce incentives for **strategic answers**).

**Data Analysis**

We estimated models explaining WTA for each of the three scenarios. Explanatory variables were selected based on **general economic theory** and **empirical evidence** on what **affects WTA in similar contractual agreements**. Hypotheses

include that: WTA is determined by household temporary or permanent wealth (as measured by income and asset index score); education level; household size; and age of the household head; reliance on environmental income; and experience of recent shocks to household welfare. We also hypothesized that WTA is influenced by: distance and quality of road from hamlet to commune (as measures of market access); size of the hamlet in terms of number of households or population size; expected profit per hectare; and household plot ownership. We also specified models for the sub-sample of households that actually owned a plot, which in addition to the mentioned explanatory variables also include: size of the plot; land classification (production, protection or special use forest); household red book certificate for the land (yes or no); perceived soil suitability; threats towards seedlings and trees; distance to transport loading site and volume of trees harvested the past 8 years.

Due to the relatively large number of potentially relevant variables and the limited sample size we used a **backward elimination process**, **sequentially dropping** explanatory variables and retaining only those that were significant in each individual model.

**Results – Socio-demographic and Silvicultural**

We observed **several significant between district differences** in household **financial and capital assets** with lower monthly net income and asset score in Ba Be. **Mean annual income per capita** was equivalent to 254 and 395 USD in Ba Be and Na Ri. Accordingly, significantly more households in Ba Be had received benefits through poverty certificate status in 2014 .

We observed several between district differences in **silvicultural features** and **production expectations** between the two districts including smaller plots, higher level of perceived threat, less timber harvested and lower expected income per hectare plot harvested in Ba Be district.

Combined this support **using a fixed effects model**.

- Significant differences in socio-demographic characteristics
    - Lower income and asset score and more households with poverty certificates in Ba Be
    - Mean annual income per capita 254 and 395 USD in Ba Be and Na Ri
    - Environmental income reliance 43 and 24% in Ba Be and Na Ri
- Significant difference in silvicultural characteristics
    - Smaller plots, higher level of perceived threat, less timber harvested and lower expected income per hectare harvested in Ba Be

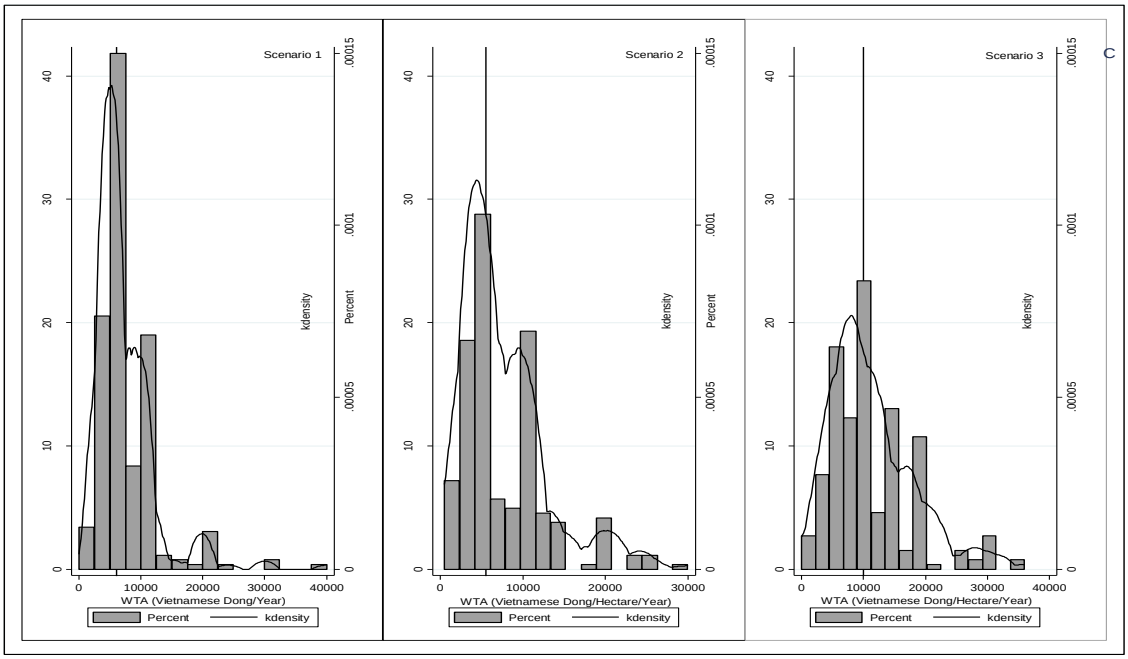



**Figure 2. Histograms with k-density plots for minimum compensation for Willing-To-Accept (WTA)**

Slightly left skewed and a procedure in STATA suggests square root transformation.

Histograms with k-density plots for minimum compensation for Willing-To-Accept (WTA) entering into a contract requiring respondent to: 1) establish a plot of own choice of tree species (i.e. Scenario 1); 2) abstain from logging a plot of mature trees (i.e. Scenario 2); and 3) refrain from logging a plot of indigenous hardwood trees. Units are thousand Vietnamese Dong per ha and per year for 2 and 3. Red vertical lines represent median values.

In all three scenarios WTA was significantly higher in Ba Be than in Na Ri districts. For scenario 2 WTA was significantly lower for the poorer in both districts and in scenario 3 WTA was lower for the poorer only in Na Ri. We observed significant positive correlations between WTA in the three scenarios. WTA compensation for establishing a plantation (Scenario one) was significantly lower than the estimated costs of establishing the plantation.

- Significantly higher WTA in Ba Be in all three scenarios
- Significantly lower WTA for the poorer in both Ba Be and Na Ri in Scenario 2 and in Na Ri in Scenario 3
- Significantly lower WTA in Scenario 1 than the costs of establishing a plantation
- Significant positive correlations between WTA in the three scenarios.

## Results – Predicting WTA

Results indicated a weak **positive** association between WTA (square root transformed) and proportion of household members with **high school education** in **Scenario two** and a **negative** association with **age** of the household head in **Scenario three**. The **asset score** was weakly and **positively** associated with WTA in Scenarios one and three, whereas the association with experience of a **severe idiosyncratic shock** is clearer. Establishment cost was insignificant and eliminated but **expected profit** was weakly **positively** associated with WTA compensation in **Scenarios one and three**.

**Table 1.** Models explaining WTA in scenario 1-3 with district as a fixed effect. Numbers in parenthesis are robust (for scenario 1 and 2) standard errors.

| | WTA Scenario 1 | WTA Scenario 2 | WTA Scenario 3 |
|---|---|---|---|
| **Level 1** | | | |
| High-school (%) | | 14.791 (0.25)* | |
| Age household head | | | -0.463 (0.17)*** |
| Asset score | 0.049 (0.00)* | | 0.180 (0.06)*** |
| Severe shock | 6.908 (0.25)** | | 10.341 (4.11)** |
| Expected profit (mill. Dong) | $1.1\times10^{-5}$ ($1.3\times10^{-6}$)* | | $8.35\times10^{-6}$ ($5\times10^{-6}$)* |
| Constant | 74.098 (0.49)*** | 79.944 (0.05)*** | 106.277 (8.22)*** |
| **Level 2** | | | |
| Level 1 residual standard deviation | 21.983 | 25.621 | 28.810 |
| Inter class correlation | 0.257 | 0.285 | 0.250 |
| Observations | 260 | 264 | 258 |
| Number of groups | 2 | 2 | 2 |
| Wald Chi-squared | 4.58*** | 3463.98** | 5.57*** |

*** p<0.01, ** p<0.05, * p<0.1

The models for **plot owners only** showed the same patterns as in the models for all households. Only one of the silvicultural variables, the **volume of timber** harvested the past eight years, had a **significant, negative**, association with WTA in Scenario three.

However, some weak, simple correlations were observed. This includes **negative correlation** between WTA and having a **red book in all scenarios**, a **negative correlation** with **plot size in Scenario three**, and a weak **positive correlation** with **threats** to seedlings and trees in **Scenario one**.

**Table 2. M**odels explaining WTA in scenario 1-3 with district as a fixed effect for households owning a forest plot only. Numbers in parenthesis are robust (for scenario 1 and 2) standard errors.

| | WTA Scenario 1 | WTA Scenario 2 | WTA Scenario 3 |
|---|---|---|---|
| **Level 1** | | | |
| High-school (%) | | 13.728 (0.76)** | |
| Age household head | | | -0.405 (0.02)** |
| Asset score | 0.043 (0.02) | | 0.186 (0.06)*** |
| Severe shock | 10.018 (3.94) | | 11.669 (4.48)*** |
| Expected profit (mill. Dong) | $1.21\times10^{-5}$ ($9.79\times10^{-7}$)* | | $6.53\times10^{-6}$ ($5.18\times10^{-6}$) |
| Timber harvest ($m^3$/8 years) | | | -0.001 (0.00)** |
| Constant | 73.566 (0.13)*** | 80.075 (0.16)*** | 105.440 (9.59)*** |
| **Level 2** | | | |
| Level 1 residual standard deviation | 21.124 | 25.703 | 28.858 |
| Inter class correlation | 0.286 | 0.291 | 0.234 |
| Observations | 223 | 226 | 221 |
| Number of groups | 2 | 2 | 2 |
| Wald Chi-squared | 6.21*** | 326.49** | 4.92*** |

*** p<0.01, ** p<0.05, * p<0.1.

**Discussion – Matching WTA and REDD+/PFES**

The results reveal that households in Ba Be on average are living **just above the international poverty line** (1.90 USD as of October 2015) at **2.09 USD per capita/day**. We also found high environmental reliance, particularly in Ba Be. It is therefore clear that the design of PFES or REDD+ project **potentially changing access to environmental products** must consider both household poverty and environmental reliance to **avoid negative impacts** on household welfare - and that location matters.

To put this into further context the respondents in Ba Be and Na Ri requested an **annual compensation** constituting **69%** (±15, 95% CI) and **25%** (±9, 95% CI) of total household income to abstain from logging their plantation (Scenario two) and 98% (±20, 95% CI) and 40% (±17, 95% CI) of total household income to refrain from logging indigenous hardwood trees (Scenario three). In comparison, PES payments to households in forested areas of Vietnam provide on average **6-7% (up to 30%)** of household incomes (McElwee et al. 2016). The high percentage may further suggest that respondents in our sample considered the **value of the timber rather than** the **opportunity cost of alternative use** of the land.

The results indicate that a **substantial amount of start-up** as well as **operational funds** would be required to provide incentives for voluntary reforestation and avoided deforestation in Bac Kan Province. The **average compensation requested** for the establishment of a plantation (Scenario one) ranged from **231 to 402 USD per ha**, and the average compensation for abstaining from logging a plantation of mature trees (Scenario two) ranged from **256-414 USD ha$^{-1}$year$^{-1}$**, both depending on the district.

- REDD+ and PFES design must consider household poverty and environmental reliance – location matters
    - Income just above the poverty line at 2.09 USD per capita/day
    - High environmental reliance
- Substantial start-up capital as well as operational funds would be required to provide incentives for voluntary reforestation and avoided deforestation
    - Compensation requested for the establishment of a plantation (Scenario one) ranged from 231 to 402 USD per ha
    - Compensation for not logging a plantation of mature trees (Scenario two) ranged from 256 to 414 USD ha$^{-1}$year$^{-1}$

The relevant **question** is to what extent this **matches available funding** in PFES and REDD+ projects where much of the discussion so far has focused on distributional coefficients. Recent calculations estimate a **likely national-level future payment rate from REDD+** of around **12 USD per ha$^{-1}$year$^{-1}$**. **PFES** amount to an average of **11**

**USD ha$^{-1}$year$^{-1}$** in some upland forests. On top of this may be added **general financial support for forest protection** measures from the state budget of **15-20 USD ha$^{-1}$year$^{-1}$**. Previous estimates more **relevant to Bac Kan Province**, suggest that forest owners may receive a **maximum of 3-8 USD ha$^{-1}$year$^{-1}$** from an **environmental services scheme**. Also, **payments for establishing forest plantations** of about **300 USD per ha** may be distributed **over a three-year period**. Hence, even assuming that a household would qualify for all of the mentioned compensation measures, **the combined amount is inadequate for matching the compensation requested** for voluntarily entering into the specified contracts (Scenarios one and two). A possible exception is the Government's Program 661 paying 300 USD per ha, although distributed across three years.

- The inability to match WTA suggests a **bleak outlook for PFES or REDD+ projects aiming to comply with social safeguard measures** to protect rural household welfare.

  To what extent does available funding in PFES and REDD+ match WTA?

  Dung and Van 2015 - Vietnam

  - Likely national-level future payment rate from REDD+ of around 12 USD per ha$^{-1}$year$^{-1}$
  - PFES amount to an average of 11 USD ha$^{-1}$year$^{-}$1 in some upland forests
  - General financial support for forest protection measures from the state budget of 15-20 USD ha$^{-1}$year$^{-1}$.

  Hoang et al. 2013 – Bac Kan

  - Maximum of 3-8 USD ha$^{-1}$year$^{-1}$ from PES schemes
  - Payments of 300 USD per ha over a three-year period for establishing forest plantations

**Discussion – Predictors of WTA**

Several household characteristics were associated with WTA and may hence be **necessary to consider in the design** of PFES and REDD+ schemes aiming to comply with social safeguards. This include a positive association between WTA and the experience of a severe idiosyncratic shock within the past 12 months in all three scenarios although only as a simple correlation in Scenario two. Timber from tree plantations have been observed as important as an **environmental insurance buffering unpredictable shocks** in other studies in Vietnam and may serve the same purpose in Bac Kan explaining **why WTA to abstain from logging** (Scenario two and three) is **higher for households that have experienced a shock**. It also seems plausible that such households will request **higher compensation for venturing into a contract** requiring them to establish a plantation, as observed (Scenario one).

Other studies have found a positive effect of income on WTA in REDD+ projects. Our results revealed no significant effect of income on WTA but a positive association between asset score and WTA in Scenarios one and three suggesting that **households with greater permanent wealth** (as opposed to transient wealth) **require higher compensation** for entering into contracts **binding them** and the use of their land to a particular income strategy.

**As expected** respondents' **anticipated profit** from **logging** was **positively** associated with WTA in Scenario two and three but **negative** in Scenario 1.

Our results indicate that **older** household heads are willing to accept **lower compensation** for refraining from logging indigenous hardwood trees than younger heads (i.e. Scenario three). This may reflect the **higher cash needs** and more uncertain economy of younger and more recently established households although logging indigenous hardwood forest, in reality, would be illegal (contrary to the hypothetical situation specified).

We also found a positive association between household size and WTA in all three scenarios that may reflect the fact that **more people have to be supported** based on the same area of land (i.e. in respect to Scenarios two and three), and reflect the **higher opportunity cost of not using this land for agriculture** to **feed the household** instead of establishing a plantation (Scenario one).

As the single significant variable in Scenario two we found a positive association with the proportion of household members having a **high-school education**. This may reflect a better **ability** of more educated households to **envision the opportunity costs** of leaving the trees standing and of land use foregone. The fact that variable was significant in explaining WTA in Scenario 2 may similarly reflect **difficulty imagining a scenario thirteen years into the future**.

- Several characteristics significantly associated with WTA necessary to consider in the design of schemes
    - Idiosyncratic shocks (+ - S, 1,2 & 3) – timber important environmental insurance - less risk willing capital
    - Wealth (+ - S1 & 3) – less willing to bind themselves to this strategy
    - Expected profit (+ -S2 & 3 and ÷ - S1) - as expected
    - Age of household head (÷ - S3) – higher immediate cash needs of younger households
    - Household size (+ - S1, 2 & 3) – higher opportunity costs of not using land for agriculture to feed the household
    - Education (+ - S2) – ability to envision opportunity costs and difficulty envisioning future scenario

The **negative** association observed between WTA and **volume timber harvested**

the past eight years in Scenario three may reflect that past logging has **exhausted all indigenous hardwood timber reducing expectation** for **compensation** for refraining from logging indigenous hardwood trees **despite the hypothetical nature of the exercise**. Similarly, the **negative** correlation with **plot size** observed in Scenario three may reflect the **lower volume hardwood potentially available**. The **positive** correlations between WTA and **perceived threats** to seedling and trees in Scenarios one and two may be explained simply by the more **risky investment** related to both **planting seedlings** and **protecting mature trees**. Finally, we found a **negative** correlation indicating that households that have a **red book certificate** requested **lower compensation** in all three scenarios. In Scenario three this might reflect **existing restrictions** on logging indigenous hardwood trees that are likely to be clearer to those that have red book certificates. However, we would expect a positive correlation in Scenario one and two reflecting the **transferred land ownership** symbolised by the red book. However, it is possible that considerations about the **duration of the 50-year lease left** as well as **taxation schemes associated with the red book** certificate **confounds this relationship**.

- Timber harvested (÷ - S3) – timber exhausted
- Plot size (÷ - S3) – lower available volume
- Perceived threat (+ - S1 & 2) – more risky investment
- Reed book certificate (÷ - S3 and S1 & 2) – existing restrictions and duration of lease and taxation schemes

**Conclusions**

The Cancun social safeguards require landholders' free prior and informed consent before entering into REDD+ projects and agreements. However, the results presented here suggests that **compensation available** from PFES, REDD+ and potentially also Government reforestation schemes combined **may be insufficient** to compensate landholders for **voluntarily entering into contracts** requiring them to establish a plantation, abstain from logging a plot of mature plantation trees or refrain from cutting indigenous hardwood trees. The **promises** of REDD+ in this respect is **unlikely to change in the near future**. **Dwindling donor commitment** and the **collapse of prices** in both the **conventional and voluntary carbon markets bodes ill** for the future of REDD+ assuming a program based strictly on **market-based payments** for monitored and **verified carbon emissions offset**.

However, we note that everyone in the sample was willing to engage in these contracts given compensation. Differences in WTA between districts in the financial and human capital and high environmental reliance must be reflected in differentiated compensation levels and the design of both PFES and REDD+ schemes to comply with social safeguard measures.

# CAN REDD+ WORK ON THE EXISTING FOREST PROPERTY RIGHTS? Lessons from Forest Management Unit and Village Forest in Berau, East Kalimantan Province, Indonesia

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## Abstract

There is a little empirical evidence on how REDD+ can work in the existing property rights of forest in Indonesia. In doing so, this article will focus on a specific objective, that is to assess the effectiveness of existing forest property rights in local forest institutions on REDD+ framework. Study was focused on two local forest institutions: Forest Management Unit (FMU) of Berau Barat, and Merabu Village Forest. Three villages were selected for indepth inquiries in order to understand deeply at the ground level through households survey. Bundle of rights constellation was analyzed by content analysis on national formal rules enacted for Forest Management Unit and Village Forest. Scoring system was used to assess the ability of local forest institutions to control additionality, leakage, and permanence. The effectiveness analysis was analyzed by qualitative method. The result argues that Merabu Village Forest provides higher forest tenure security than the FMU of Berau Barat. Constelation of forest rights on Merabu Village Forest is more effective to achieve REDD+ outcomes, indicated by its capacity to control additionality, leakage, and permanence. Furthermore, some lessons learned are found in order to improve local forest institution for REDD+ framework, among other, the need of the leakage management system development, integration of national and local tenure efforts, local knowledge involvement, law enforcement capacity, and community awareness rising.

***Key words**: REDD+, forest, property rights, Forest Management Unit, Village Forest*


- Tenure and rights is the biggest challenge.

  *REDD+ implementation face high risks where land rights and ownership problems exist.*

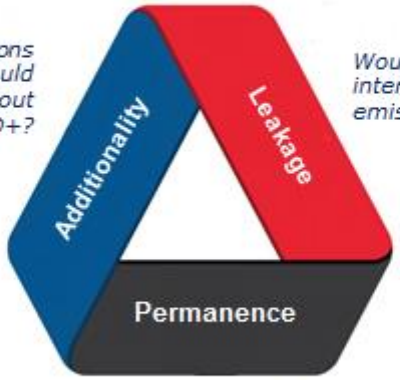
- Property rights of forest plays an important role in REDD+ effectiveness to achieve outcomes beyond deforestation reduction.

Forest rights regime in Indonesia: State property regime with various management rights types

## The unique concept of REDD+:

*new concept - old approach*

*Are the emission reductions additional to what would have occurred without REDD+?*



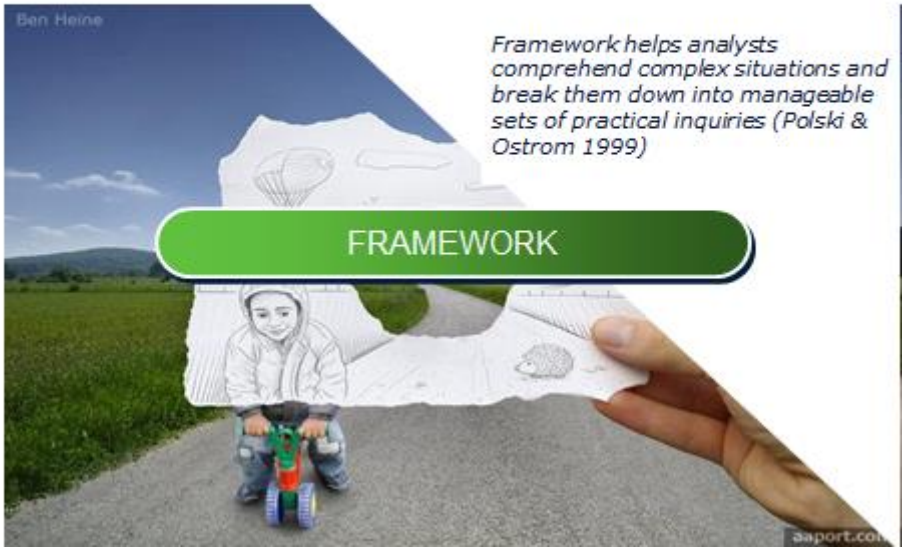

*Would REDD+ interventions shift emissions elsewhere?*

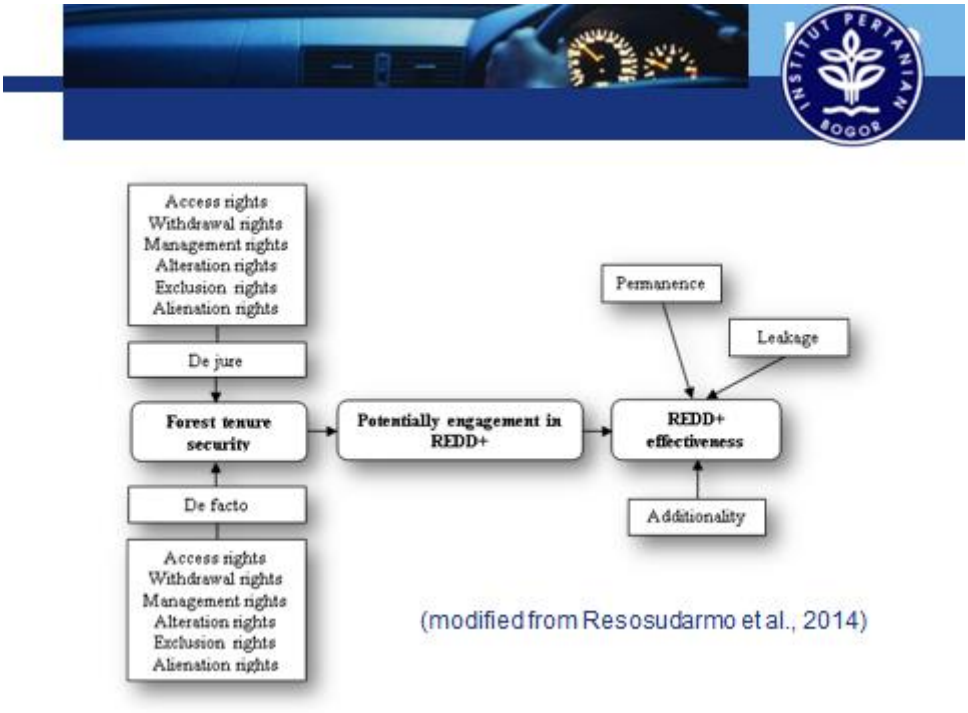
*Are the emission reductions permanent?*

REDD+ contextual outcome

Existing forest property rights

**A fundamental question is to what extent the existing forest property rights enacted at local forest institutions effective to support REDD+ contextual outcomes.**


Ben Heine
Framework helps analysts comprehend complex situations and break them down into manageable sets of practical inquiries (Polski & Ostrom 1999)
FRAMEWORK


Access rights
Withdrawal rights
Management rights
Alteration rights
Exclusion rights
Alienation rights
De jure
Forest tenure security
De facto
Access rights
Withdrawal rights
Management rights
Alteration rights
Exclusion rights
Alienation rights
Potentially engagement in REDD+
Permanence
Leakage
REDD+ effectiveness
Additionality
(modified from Resosudarmo et al., 2014)

# Method

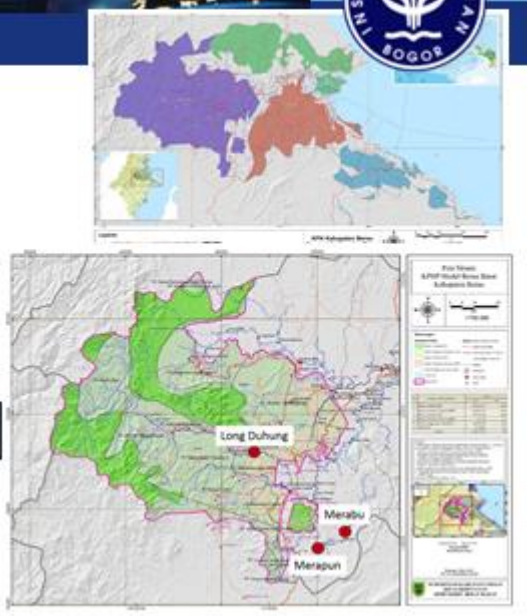
Bundle of rights → content analysis.

Scoring system → ability of local forest institutions to control additionality, leakage, and permanence.

The range of level of ability was determined by formula:

$$Range = \frac{Maximum\ score - Minimum\ score}{Number\ of\ category}$$

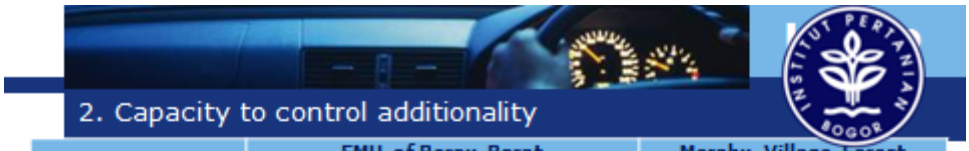
- High
- Moderate
- Low




# Indicators and verifiers:

| Criteria | Indicator | Scoring system |
|---|---|---|
| **Ability to control additionality** | - Ability to conduct enrichment planting, rehabilitation, reclamation, or other planting activities.<br>- Ability to involve local knowledge/local wisdom on forest management and forest use.<br>- Ability to involve local knowledge/local wisdom on forest protection activities | 3 : can make decision to conduct additionality-releted activities based on the available resources.<br>2 : part of the system who can make decision<br>1 : can not make decision<br>(Total score in this criteria: maximum score=9; minimum score=3) |
| **Ability to control leakage** | - Availability of livelihood change mechanism<br>- Buffer zones availability (or other forest surrounding the FMU/Village Forest area functioned as a buffer) to localize community land-based activities<br>- Buffer zones ownership and management rights<br>- Buffer zone management<br>- Cut the buffer zone to substitute the need on wood product | 3 : there is a mechanism which is directly support to avoid unplanned forest convertion or logging in other forest areas<br>2 : there is a mechanism which is indirectly support to avoid unplanned forest convertion or logging in other forest areas<br>1 : there is no mechanism at all.<br>(Total score in this criteria: maximum score=15; minimum score=5) |
| **Ability to control permanence** | - Ability to exclude unwanted outside users<br>- Type of outsider could be excluded<br>- People compliance to forest rules<br>- Rules enforcement and sanction<br>- Insurance<br>- Share liability | 3 : significant progress and maximum power and authority to conduct permanence related-activities<br>2 : progressing well, but further development required<br>1 : no demonstrating progress<br>(Total score in this criteria: maximum score=24; minimum score: 6) |

## Results & Discussion


| Atribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| Ability to conduct enrichment planting, rehabilitation, reclamation, or other planting activities. | FMU can make decision to conduct additionality-related activities. FMU developed long term and annual plan, supported by particular human and fund resources. | 3 | Kerima Puri & village authority can make decision to conduct additionality-related activities. They developed business and annual plan. | 3 |
| Ability to involve local knowledge/local wisdom on forest management and forest use. | FMU has authority to identify and invite local widoms. FMU needs approval from the MoEF. Final decision officially come from central government. | 2 | Kerima Puri and village authority able to identify and invite local wisdom, and decide to involve them directly. | 3 |
| Ability to involve local knowledge/local wisdom on forest protection activities | FMU has authority to identify and invite local widoms, and decide to involve them. FMU needs approval from the MoEF. Final decision officially come from central government. | 2 | Kerima Puri and village authority able to identify and invite local wisdom, and decide to involve them directly. | 3 |
| **Total** | | **7** | | **9** |
| **Level of ability** | **Medium** | | **High** | |

## Capacity to control leakage

| Attribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| Availability of livelihood change mechanism | There were trainings, capacity buildings, and other community development activities. However, it was not followed by intensive assisstance to change their behaviors become environmental friendly livelihoods. | 2 | There are trainings, capacity buildings, and other community development activities, and assisstance by TNC, focused on ecotourism development. Income from forest services now emerge. | 3 |
| Buffer zones availability (or other landuses surrounding the FMU/Village Forest area functioned as a buffer) to localize community land-based activities. | There is no buffer zone. There are forest and other landuses areas surrounding FMU (forest area at other Districts, concession forest area of PT Inhutani and others, as well as plantation, and settlement), but those areas are not the buffer zone. | 1 | There is no buffer zone. However there is a agricultural or cultivation area surrounding Village Forest functioned as a buffer zone. | 2 |

## Capacity to control leakage (continue...)

| Attribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| Buffer zone ownership and management rights | Forest areas and plantation surrounding the FMU are belongs to the State, while settelement is belong to private.<br>Forest areas and plantation are managed by private companies. | 1 | The protection and production forest areas are belong to the State. Protection forest is managed by local government, while production forest is managed by logging firm. | 2 |
| Buffer zone management | Most of those forest areas are managed as a production forest using selective cutting method. | 1 | Local government reserves the protection forest area, and logging firm cuts the forest by selective cutting method. | 2 |
| Cut the buffer zone to substitute the need on wood product | FMU does not have authority to control (reserve) those forest areas, as well as does not cut those forest area. | 3 | Villagers do not harvest those forest area. | 3 |
| ***Total*** | | ***8*** | | ***12*** |
| ***Level of ability*** | ***Low*** | | ***High*** | |

## Capacity to control permanence

| Attribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| Ability to exclude unwanted outside users | There is only 1 forest ranger available. It is not possible to control forest area of 288,935.26 ha (concession areas are excluded).<br>Preventive approaches:<br>1) Developing SOP of forest patrol<br>2) Establishing Forest Patrol Unit<br>3) Involving community in the forest protection programme (forest care unit)<br>In case of double claims based on different source of legitimacy, then the FMU adopts a partnership approaches to resolve the conflicts. | 1 | There is no experience on exclusion of outside users. It has not been logging, encroachment, or conflicting rights over Merabu Village Forest.<br>However, Merabu people is now on going process in against Merapun people who claim another forest area. Then they looking forward local government decision to resolve the village boarder. | 2 |
| Type of outsider could be excluded | Ideally FMU could exclude large scale player (such as: timber or oil palm company), as well as small scale player (including individual player). But in practice, both for large and small scale players are difficult to be excluded directly by the FMU. | 1 | Village authority and villagers could exclude small scale player (including individual player). Large scale player (such as: timber or oil palm company) is more difficult to be excluded without any additional support from local government and NGO. | 2 |

## Capacity to control permanence (continue...)

| Attribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| People compliance to forest rules | A lot of people and concession rights holders of the FMU area (50-75%) comply with forest rules.<br>Deforestation occured of 4,816.74 ha during period 2012-2015 (or 1,431.99 ha annualy).<br>Accumulated deforested area of the FMU area on 2015 (since 2000) was now 16,291.27 ha. | 1 | Merabu people, in majority (>75%), comply with Vilage Forest rules. The annual deforestation is zerro during period 2012-2015. | 3 |
| Rules enforcement and sanction | There was around 20,000 ha of concession forest area (PT Inhutani I Labanan) encroached by people. But rule enforcement and sanction is very rarely.<br>Most of case used community development and social approach to resolve the case. | 1 | There is no experience on rule enforcement for the rule breakers within Merabu Village Forest area.<br>However, some violations were found at another area/forest surrounding village. The sanction was in-kind fines (the fines was not in cash, such as renovating villager housings, village road, bridge, etc.). | 3 |

## Capacity to control permanence (continue...)

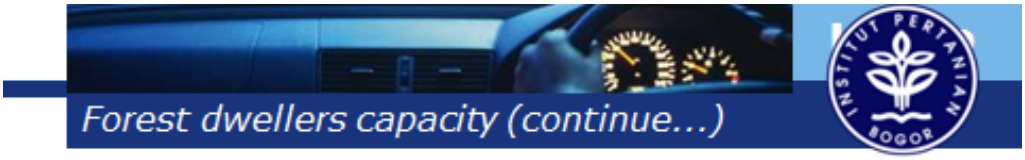
| Attribute | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Evidence | Score | Evidence | Score |
| Insurance | There is no insurancemechanism | 1 | There is no insurance mechanism | 1 |
| Share liability (budget allocation to maintain, protect, and sustain the fores, and source of fund) | - 2015: District gov budget= IDR 1,516,210,000 (budget ratio = IDR 1,928.97/ha)<br>- 2016: Total budget 2016 = IDR 8,656,564,916 (consisted of District gov budget=IDR 7,373,943,916.; and Central gov budget=IDR 1,282,621,000) (Budget ratio = IDR 11,013.15/ha).<br>- The funding come from Central government, local government, TNC, Forclime.<br>- There are also development partners (such as Froclime, and TNC) who allocate their budget to support the FMU programmes and activities. | 2 | - 2014:Village budget = IDR 29,300,000 (budget ratio=IDR 3,554 /ha).<br>- 2015: Village budget = IDR 10,000,000 (budget ratio=IDR 1,213/ha).<br>- The funding coming from Village fund, local government, TNC.<br>- There are other fund sources (from NGO's such as TNC and TFCA) to support village forest management activities. | 2 |
| *Total* | | *7* | | *13* |
| *Category* | *Low* | | *Medium* | |

## REDD+ effectiveness based on capacity to control additionality, leakage, and permanence

| Indicator | FMU of Berau Barat | | Merabu Village Forest | |
|---|---|---|---|---|
| | Total score | Category | Total score | Category |
| Additionality | 5 | Moderate | 9 | High |
| Leakage | 8 | Low | 12 | High |
| Permanence | 7 | Low | 13 | Moderate |
| **REDD+ effectiveness** | **20** | **Low** | **34** | **High** |

## 3. Forest dwellers capacity

| Atribute | Criteria | Indicator | Village (in % of respondent) | | |
|---|---|---|---|---|---|
| | | | Merabu | L Duhung | Merapun |
| Capacity to control additionality | Ability to conduct planting activities | Can make decision to conduct planting activities | 4,3 | 8,3 | 2,6 |
| | | Part of the system who can make decision | 17,4 | 25 | 7,9 |
| | | Can't make decision | **78,3** | **66,7** | **89,5** |
| | Ability to involve local knowledge of forest management/utilization | Can make decision to conduct | 6,5 | 4,2 | 2,6 |
| | | Part of the system who can make decision | 15,2 | 33,3 | 5,3 |
| | | Can't make decision | 34,8 | 16,7 | 30,3 |
| | | Don't have local knowledge | **43,5** | **45,8** | **61,8** |
| | Ability to involve local knowledge of forest protection | Can make decision to conduct | 6,5 | 0 | 2,6 |
| | | Part of the system who can make decision | 15,2 | 33,3 | 5,3 |
| | | Can't make decision | 30,4 | 16,7 | 28,9 |
| | | Don't have local knowledge | **47,8** | **50** | **63,2** |
| Capacity to control leakage | Logging other forests | Yes | 4,3 | 8,3 | 1,3 |
| | | No | **95,7** | **91,7** | **98,7** |



## *Forest dwellers capacity (continue...)*

| Atribute | Criteria | Indicator | Village (in % of respondent) | | |
|---|---|---|---|---|---|
| | | | Merabu | L Duhung | Merapun |
| Capacity to control permanence | Exclusion capacity | Always | 10,9 | 16,7 | 3,9 |
| | | Often | 15,2 | **50** | 3,9 |
| | | Never | **73,9** | 33,3 | **92,1** |
| | Who are able to be excluded | Large scale | 10,9 | 12,5 | 5,3 |
| | | Small scale/individual | 6,5 | **62,5** | 2,6 |
| | | Other | 17,4 | 0 | 0 |
| | | Don't know | **65,2** | 25 | **92,1** |
| | Level of obedience on forest rules | All (100%) | **52,2** | **58,3** | 28,9 |
| | | Majority (more than ¾) | 30,4 | 8,3 | **39,5** |
| | | Some (½ - ¾) | 10,9 | 20,8 | 15,8 |
| | | Minority (¼ - ½) | 2,2 | 8,3 | 9,2 |
| | | Less (less than ¼) | 0 | 4,2 | 1,3 |
| | | Noone | 0 | 0 | 5,3 |
| | | Don't know | 4,3 | 0 | 0 |
| Rights enforcement cost capacity | Fund participation | Yes | 6,5 | 12,5 | 0 |
| | | No | **93,5** | **87,5** | **100** |

Paired Samples Test

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Pair 1 | Merabu - Long_Duhung | -.4310 | 19.3568 | 3.5945 | -7.7940 | 6.9319 | -.120 | 28 | .905 |
| Pair 2 | Merabu – Merapun | -.2069 | 11.3542 | 2.1084 | -4.5258 | 4.1120 | -.098 | 28 | .923 |
| Pair 3 | Long_Duhung – Merapun | .2241 | 26.3259 | 4.8886 | -9.7897 | 10.2380 | .046 | 28 | .964 |

1) Forest dwellers capacity in controlling **additionality and permanence** does not sufficient to support the effectiveness of FMU and Village Forest on REDD+ framework, but support for avoiding **leakage**.
2) There is **no significant difference** among three villages

DISCUSSIONS

Constelation of forest rights on Merabu Village Forest is more effective to achieve REDD+ outcomes, indicated by its capacity to control additionality, leakage, and permanence.

❖ Span of control

- Village Forest area (8,245 ha) < FMU area (786,021 ha).

- People participation on forest management & protection in VF>FMU.

It helps to enhance villager capacity to enforce their management rights.

❖ Transfer of management rights

- Devolution model is effective to create responsibility on rule enforcement.

- A positive outcome from devolution model : able to encourage user group to organize theirself in way that are adopted to their circumstances, exist in conjunction with well-organized user groups with strong connections with national and international network who can advocate on their behalf (Lawry & McLain, 2012).

Next challange: improve the effectivenes of FMU of Berau Barat for REDD+

❖ Capacity to involve local knowledge/local wisdom in forest management and forest protection activities need to be improved → **Transfer full authority, explore another scheme or program in involving local people**

- ❖ Buffer zone system should be provided inside the FMU area → **livelihood change system**
- ❖ Rationalization of forest ranger ratio with the forest area.

**Leakage management system** development is a priority to improve local forest management institution in accordance with the REDD+ framework. **Additionality** can be positioned as a main strength of forest management programmes or activities for both local forest institutions.

Insight from three villages implies:

- No interrelationship between local forest institutions and individual ability in determining capacity to control additionality, leakage, and permanence.

Individually, community in Merabu Village has low performance on controlling additionality and permanence, whereas as an institution, Merabu Village Forest authority (Kerima Puri) has high performance on both attributes.

- Local forest institutions have not been developed forest dwellers capacity in the context of REDD+ framework.

## CONCLUSIONS

**Conclusion**

- ❖ Constelation of forest rights on devolutive model is more effective to achieve REDD+ outcomes
- ❖ Not about the trees and forest stand, but how to change the people interest

**Way forward:**

- ❖ Leakage management system should be part of local forest institutions strategy.
- ❖ Vertical Integration of national and local forest rights, strengthening village institutions and enhancing internal compliance.
- ❖ Horizontal integration among sectors to improve local people involvement in forest management and protection activities.

# FAIRNESS AND TRANSPARENCES IN PAYMENT FOR FOREST ECOSYSTEM SERVICES PROGRAMS IN VIETNAM: A COMMUNITY BASED EVALUATION

**Cao Truong Son, Nguyen Thanh Lam, Nguyen Thi Huong Giang, Nguyen Hai Nui, Tran Duc Vien**

*Vietnam National University of Agriculture*

## Abstract

Payment for forest ecosystem services (PFES) has been widely implemented in Vietnam, in accordance to the Decree No. 99/2010/NĐ-CP. In order to gather community's opinions about the fairness and transparences of PFES's implementation, two cased studies of direct payment and indirect payment program in Ba Be District, Bac Kan Province were selected to investigate. In this study, we used the five points scale to rank the level of "Importance" and "Implementation" of eights criteria of fairness and five criteria of transparences. There was 167 people ( 57 people involved in direct PFES program and 110 involved in indirect PFES program) participated in evaluation process through the questionnaire. The results point out, community highly evaluated the fairness and transparences in term of "Importance" (most of opinions are importance and very important level). Nevertheless, the "Implementation" of these criteria had lower evaluated points (mostly at good and moderate level). Comparing the evaluation results between service providers and services buyers, the statistical analysis pointed out there was not statistical significant in term of "Important" criteria. However, the difference between service provider and buyers' evaluation regarding to "Implementation" was significant. The mean points of service providers relatively higher than the service receivers' do. In addition, the analysis also found that, participants in direct PFES program evaluated the fairness and transparences higher than of whom from indirect PFES program. Finally, we state that, policy makers and other stakeholders should include fairness and transparence criteria in designing evaluation framework of PFES programs in Vietnam.

***Key words:*** *Payment for forest ecosystem services, evaluation, fairness, transparences*

## SECTION 5: DOES REDD+ AND FOREST PLANTATION PROGRAMS ENHANCE LOCAL LIVELIHOOD?

**Chairs: Dr.Iskandar[1/] & Dr.Martin[2/]**

*[1/]Bogor Agricultural University*

*[2/]IFRO, University of Copenhagen*

SUMMARY

*This section presents how REDD+ and forest plantation programs improve local livelihood in Vietnam and Indonesia. Different points of views have been discussed (i.e. from farmers, from forest agencies, local authorities, NGO, and donors. All research papers found that local livelihood change so quickly, but REDD program has only little impact on local livelihood as it has just started. All farmers are still depending on forest resources and economic growth will expand the gaps between better of the poor.*

# LIVELIHOOD DEVELOPMENT OF FOREST DEPENDENT HOUSEHOLDS WITHIN A REDD+ IMPLEMENTATION AREA IN BAC KAN PROVINCE, VIETNAM

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## Abstract

Natural forests have played an important role for rural livelihoods in the upland of Vietnam. However, the primary forest area is continuously declining. Forest plantation and regeneration are urgently needed. This study examines the livelihood development of forest dependent households through a study in Bac Kan province, Vietnam. The following questions are addressed: What are the characteristic of forest dependent households? What are their livelihood strategies related to forest resources? How are their livelihood capitals, livelihood outcome? How are their livelihood comparing with 5 year before? How sustainable are their livelihood?

The study was conducted in two districts representing upland areas with large forest areas and forest cover in BacKan province namely Na Ri and Ba Be. In each district, the study selected two highland communes. Each of them is conducted in the highland hamlets where households have access to forest land and access to forest resources. Due to the small number of households, it is necessary to study and conduct the whole household survey in each hamlet by direct interview method with 265 households. The focus of the survey is on the indicators of the components of the sustainable livelihoods framework. Student's t-test, Chi square and ANOVA were used to test the livelihood differences among the groups. In order to reveal the factors effect to livelihood outcome, the regressions were applied.

The share of forest environmental income in total household income was used to obtain a mutually exclusive choice of livelihood strategies of households. The average forest environment income contributes to household livelihood was 22%. Livelihoods of the selected households were classified into less, moderate, and highly dependent on forest. Around 51% of households choose “less dependent on forest” livelihood strategy with 16.5% of forest environment income on average. With an average forest income share of 26.8%, 47.5% households select “moderately dependent on forest” livelihood strategy. There are only 1.5% households pick “highly dependent on forest” livelihood strategy. The forest environment incomes mainly support current consumption and the dependence on forest differs among households. The poorer households are more dependent on forest than wealthy households. And the level of

forest dependence of local people has been reduced overtime. A proposed REDD+ regime provides an opportunity for sub-national actors to address the issue of poverty in resource rich forests regions. The benefit sharing mechanism needs to be framed appropriately and transparently, in order to overcome the livelihood issues in REDD+ implementation area.

The results show that the livelihoods of the high dependency groups, the poor households are more limited compared to the other groups, the high forest dependency and the low income. In the five livelihood capital groups, the human, financial and physical capitals of the high dependency group are the weakest. On average, only 37.74% of households said that their income meets the minimum demand, while the high debt ratio (76.6%) and almost insignificant savings. In addition, the level of education is also a concern when the level of household head is mainly primary and secondary school, the rate of households with stable income is only 27.6%. and it is very different between households groups. In terms of physical capital, the housing status of the household is mostly semi-solid with low quality, poor household assets and production assets. However, the natural and social capitals of the household are quite assured. The rate of households participating in hamlets meetings, social relations in the community is tight, the area of cultivated land is assured plus the access to water. Household income is relatively low, average income is 34.4 million VND / year, average income per capita is about 600 thousand VND / month. 14/21 independent variables were statistically significant at 1-10%. The estimated coefficient of variation in livelihood resources with high confidence indicates a clear impact on household income. In particular, the group of financial and human resources has the most influence. This result implies that households can improve their income by improving their livelihoods. Therefore, first and foremost, local authorities should pay more attention to education and training. This may not help households improve their income in the short term but it is a sustainable solution in the long run. In addition, vocational training, promotion of handicraft and non-agricultural forestry to create favorable conditions for households with at least one worker with stable income. This solution will help households and localities change their occupational structure, contributing to the diversification of their incomes. With regard to the current debt situation of the household, local authorities should diversify types of credit support, avoid the need to sell rice farmers or traders with high interest rates. At the same time, it is necessary to continue building village culture, community solidarity, harmony, trust and help each other. Continuing to implement effective forest land allocation, avoiding encroachment and overlapping ownership. At the same time, in upland areas, the main forest are protection forest and special use forest which is allocated to the community for

management and the forest of the household is mainly for regeneration. Therefore, the State should have policies to reduce the dependence on forests of the household, there should be solutions to support the development of non-forestry industry such as cultivation, breeding rather than exploitation of forest resources.

***Keywords:*** *forest dependence, livelihood strategies, REDD+, Bac Kan province*

## 1. Introduction

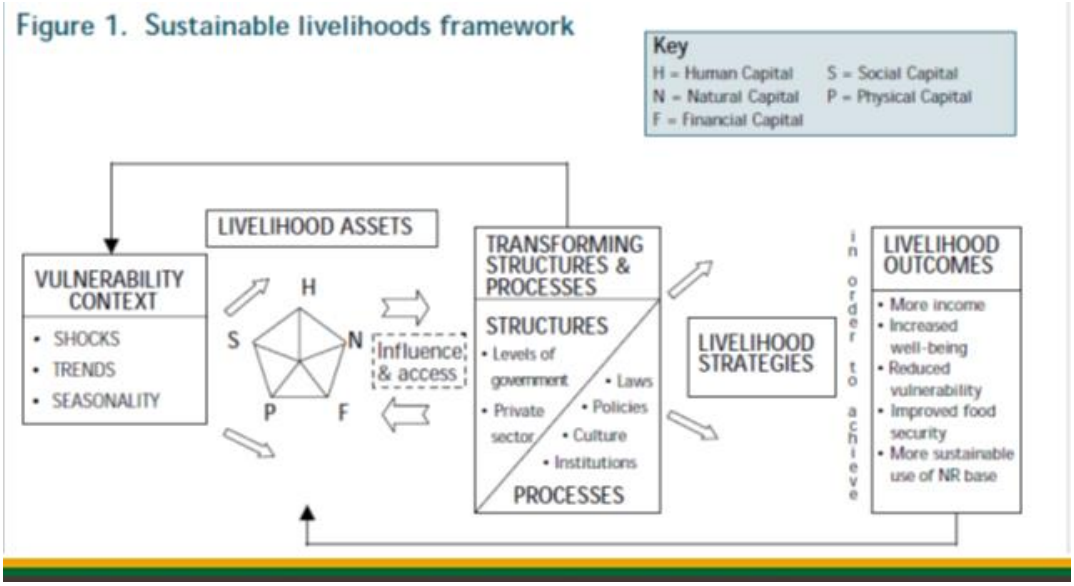
- Forest has been a key component of rural livelihood. They are important both socially and economically
- The level of reliance on forest environmental products differs between households. Reliance reflects different livelihood strategies determined by household capitals
- BacKan is a mountainous province that has the largest forest cover in Vietnam

## 2. Methodology

- Study site: The district of Ba Be and Na Ri
  - Ba Be: Hoang Tri and Dong Phuc commune
  - Na Ri: Lang San and Van Hoc commune
- Sampling
  - Surveyed hamlets: Hamlets in upland areas
  - Selected HHs: all HHs in the hamlets
- Sample size: 265 households
- Descriptive statistics are used to describe livelihood capitals as well as household livelihood strategies
- Statistics test: T-Test, Chi square test, Anova analysis
- Regression: logit, multi-logit, multi-regression
- Likert Scale, Balance scorecard

**Table 1. Sample size: 265 households**

| Districts | Communes | Hamlets | Households |
|---|---|---|---|
| Babe | HoangTri | Ban Duong | 28 |
| | | Cooc Mu | 34 |
| | | NaDieu | 36 |
| | DongPhuc | KhuuQuang | 33 |
| | Sub-Total | | **131** |
| NaRi | LangSan | KhauLa | 22 |
| | | NaHiu | 17 |
| | | NamCa | 12 |
| | | KhuoiSap | 13 |
| | VanHoc | PoPhyeo | 17 |
| | | NaCa | 23 |
| | | PotRan | 30 |
| | Sub-Total | | **134** |
| **Total** | | | **265** |




## 3. Results and discussion

### *3.1 Findings*

**Livelihood strategies definition**

| Livelihood strategies | Definition |
|---|---|
| LS #1:'high dependence' on forest income. | Forest income share is greater or equal 40% |
| LS #2:'moderate dependence' on forest income. | Forest income share is from 20% to 40% |
| LS #2:'less dependence' on forest income. | Forest income share is smaller or equal 20% |

**3.1. Livelihood strategies**

| Indicators | Units | Districts | | Poverty | | Grand |
|---|---|---|---|---|---|---|
| | | Babe | Nari | Poor | Non poor | |
| **Total Households** | HHs | **131** | **134** | 94 | 171 | **265** |
| **LS1: High** | HHs | **50** | **23** | 29 | 44 | 73 |
| | % | **38,17** | **17,16** | 30,85 | 25,73 | **27,55** |
| **LS2: Moderate** | HHs | **43** | **37** | 33 | 47 | 80 |
| | % | **32,82** | **27,61** | 35,11 | 27,49 | **30,19** |
| **LS3: Less** | HHs | **38** | **74** | 32 | 80 | 112 |
| | % | **29,01** | **55,22** | 34,04 | 46,78 | **42,26** |
| **(p) $\chi^2$ test** | | | 0,000 | | 0,100 | |

| Variables[tb] | | Coef. | Robust Std. Err. | Z | P> \|z\| |
|---|---|---|---|---|---|
| poverty[a] | | -0,5721[NS] | 0,3786 | -1,5100 | 0,1310 |
| vulne[a] | | 0,4617[NS] | 0,3412 | 1,3500 | 0,1760 |
| Log(hhage) | | -1,6234[***] | 0,4928 | -3,2900 | 0,0010 |
| hhedu[a] | 1 | 0,1097[NS] | 0,9018 | 0,1200 | 0.9030 |
| | 2 | -0,8250[*] | 0,4793 | -1,7200 | 0.0850 |
| | 3 | -0,7974[*] | 0,4419 | -1,8000 | 0.0710 |
| hhlabor[a] | | 1,7559[***] | 0,4365 | 4,0200 | 0,0000 |
| saving[a] | | 1,0457[**] | 0,5282 | 1,9800 | 0,0480 |
| incomesour[a] | | 0,5157[NS] | 0,3325 | 1,5500 | 0,1210 |
| helpgeting[a] | | 1,2128[***] | 0,4484 | 2,7000 | 0,0070 |
| trust[a] | | -0,8444[NS] | 0,5662 | -1,4900 | 0,1360 |
| Log(agriland) | | 0,3820[NS] | 0,3531 | 1,0800 | 0,2790 |
| Log(forestland) | | 0,2055[**] | 0,1040 | 1,9800 | 0,0480 |
| Log(othersland) | | 0,4591[**] | 0,1979 | 2,3200 | 0,0200 |
| forestacces[a] | | -0,4910[NS] | 0,3373 | -1,4600 | 0,1450 |
| housing[a] | | 0,6088[*] | 0,3482 | 1,7500 | 0,0800 |
| assets[a] | | -0,4365[NS] | 0,3650 | -1,2000 | 0,2320 |
| hamletmeeting[a] | | -1,1859[NS] | 0,8961 | -1,3200 | 0,1860 |
| local_par[a] | | 0,2325[NS] | 0,4156 | 0,5600 | 0,5760 |
| pa_par[a] | | -0,7719[NS] | 0,5116 | -1,5100 | 0,1310 |
| /cut1 | | -9,59915 | 2,140297 | | |
| /cut2 | | -7,6788 | 2,120703 | | |

Factors effecting on Livelihood Strategy selection

### *3.2. Livelihood Outcome Development*

## 3.2.1. Households income

| Income sources | | LS | | | District | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|---|---|
| | | High | Moderate | Less | Babe | Nari | Poor | Non Poor | |
| **Cultivation** | TB | **6,26** | 9,09 | **12,38** | 8,33 | 11,05 | 6,99 | 11,19 | **9,70** |
| | (p) T-test | | 0,000 | | 0,001 | | 0,000 | | |
| **Livestock** | TB | 0,12 | 6,39 | 9,49 | 5,33 | 6,60 | 4,25 | 6,92 | 5,97 |
| | (p) T-test | | 0,000 | | 0,460 | | 0,103 | | |
| **Forest** | TB | **11,32** | 7,62 | **3,81** | 7,79 | 6,29 | **5,60** | **7,82** | **7,03** |
| | (p) T-test | | 0,000 | | 0,055 | | 0,004 | | |
| **Non-Agri** | TB | 0,77 | 4,78 | **21,19** | 5,11 | 16,00 | **4,29** | **14,09** | 10,61 |
| | (p) T-test | | 0,000 | | 0,000 | | 0,000 | | |
| **Others** | TB | 0,20 | 0,35 | 2,14 | 0,86 | 1,26 | 0,19 | 1,54 | 1,06 |
| | (p) T-test | | 0,017 | | 0,541 | | 0,008 | | |
| **Total income** | TB | **18,68** | 28,23 | **49,01** | 27,42 | 41,20 | **21,32** | **41,57** | **34,38** |
| | (p) T-test | | 0,000 | | 0,003 | | 0,000 | | |

| Variables | | Coef. | R Std. E. | Z | P>\|z\| | VIF |
|---|---|---|---|---|---|---|
| ***Livelihood strategies*** | *High*[bases] | | | | | |
| | *Moderate* | 0,300*** | 0,093 | 3,22 | 0,002 | 1.76 |
| | *Less* | 0,258** | 0,107 | 2,40 | 0,017 | 2.34 |
| ***Financial Capitals*** | | | | | | |
| HH income reaches basic need [d] | | 0,314*** | 0,084 | 3,75 | 0,000 | 1,48 |
| HH has stable income labor [d] | | 0,168* | 0,100 | 1,68 | 0,094 | 1,88 |
| HH has savings [d] | | 0,241* | 0,124 | 1,95 | 0,053 | 1,3 |
| HH is in dept [d] | | -0,240*** | 0,081 | -2,97 | 0,003 | 1,11 |
| HH has more than three income sources [d] | | 0,173** | 0,087 | 1,98 | 0,049 | 1,84 |
| ***Human Capitals*** | | | | | | |
| Household Head Education | *Less than primary* | 0,157[ns] | 0,188 | 0,83 | 0,405 | 1,58 |
| | *Primary* | -0,186* | 0,102 | -1,83 | 0,069 | 2.32 |
| | *Secondary* | -0,173* | 0,092 | -1,88 | 0,062 | 1.76 |
| | *Above*[bcs] | | | | | |
| Number of Household members [log] | | 0,308** | 0,134 | 2,30 | 0,023 | 1,4 |
| Age of Household members (years) [log] | | 0,172* | 0,101 | 1,70 | 0,091 | 1,31 |

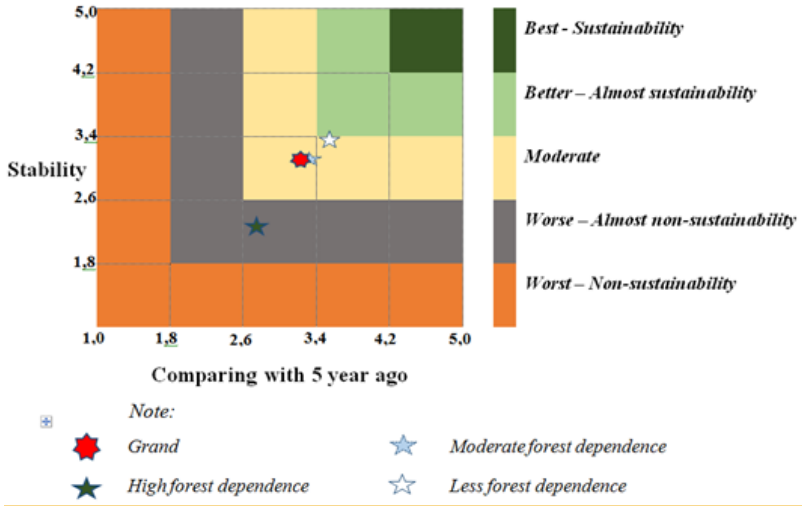
Factors effecting on Household income

| Variables | | Coef. | R Std. E. | Z | P>\|z\| | VIF |
|---|---|---|---|---|---|---|
| ***Natural Capitals*** | | | | | | |
| Agriculture land area (ha) [log] | | 0,098[ns] | 0,073 | 1,34 | 0,181 | 1,47 |
| Forestland area (ha) [log] | | 0,062** | 0,031 | 2,03 | 0,044 | 2,08 |
| HH access to forest easily [d] | | -0,056[ns] | 0,070 | -0,81 | 0,421 | 1,18 |
| HH access clean water [d] | | 0,107[ns] | 0,078 | 1,37 | 0,172 | 1,4 |
| **Physical capital** | | | | | | |
| Housing situation | *Permanent*[base] | | | | | |
| | *Semi-permanent* | 0,030[ns] | 0,076 | 0,40 | 0,690 | 1,31 |
| | *Temporary home* | -0,444* | 0,264 | -1,68 | 0,094 | 1,48 |
| Housing quality | *good*[base] | | | | | |
| | *Normal* | -0,301*** | 0,101 | -2,97 | 0,003 | 1,51 |
| | *Bad* | 0,062[ns] | 0,193 | 0,32 | 0,750 | 2,04 |
| Value of HH non-productive assets [log] | | 0,218*** | 0,068 | 3,18 | 0,002 | 1,93 |
| Value of HH productive assets [log] | | 0,094[ns] | 0,067 | 1,39 | 0,165 | 1,85 |
| ***Social Capitals*** | | | | | | |
| HH participate hamlet meeting [d] | | -0,121[ns] | 0,254 | -0,48 | 0,633 | 1,23 |
| HH members of a forest patrol [d] | | 0,114[ns] | 0,098 | 1,16 | 0,248 | 2,04 |
| HH get help when need [d] | | 0,097[ns] | 0,114 | 0,85 | 0,396 | 1,43 |
| HH trust their neighbors [d] | | 0,307** | 0,130 | 2,37 | 0,019 | 1,29 |
| Intercept | | 7.901*** | 0.545 | 14.51 | 0.000 | |

Factors effecting on Household income

| Indicators | | Livelihood strategies | | | Grand |
|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | |
| Household income comparing with 5 year ago | *Average (points)* | 2,75 | 3,35 | 3,57 | 3,28 |
| | *Much smaller (%)* | 9.59 | 3.75 | 6.25 | 6.42 |
| | *Little smaller (%)* | 27.40 | 16.25 | 15.18 | 18.87 |
| | *Non-change (%)* | 43.84 | 37.50 | 23.21 | 33.21 |
| | *Little bigger (%)* | 16.44 | 26.25 | 25.89 | 23.40 |
| | *Much bigger (%)* | 2.74 | 16.25 | 29.46 | 18.11 |
| | *(p) $\chi^2$test* | 0.00 | | | - |
| Stable level of household income | *Average (points)* | 2.33 | 2.95 | 3.36 | 2.95 |
| | *Totally non-stable (%)* | 17.81 | 7.50 | 5.36 | 9.43 |
| | *Non-stable (%)* | 46.58 | 31.25 | 16.96 | 29.43 |
| | *Normal (%)* | 21.92 | 25.00 | 26.79 | 24.91 |
| | *Stable (%)* | 12.33 | 31.25 | 37.50 | 28.68 |
| | *Totally stable (%)* | 1.37 | 5.00 | 13.39 | 7.55 |
| | *(p) $\chi^2$test* | 0.00 | | | - |

***Sustainable household income development***




**Household income *assessment***

## 3.2. Poverty status

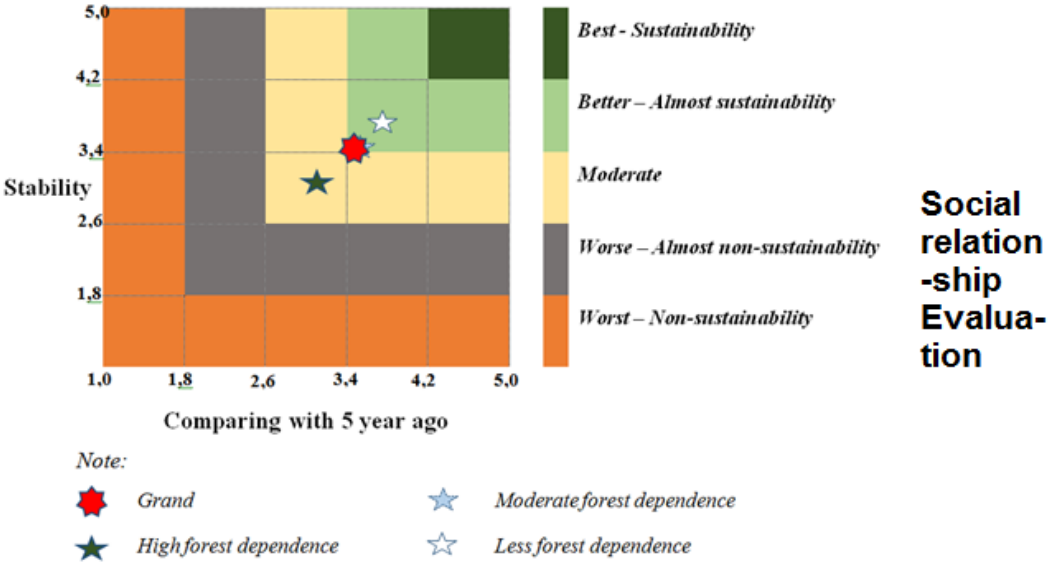
| Indicators | Livelihood strategies | | | District | | Grand |
|---|---|---|---|---|---|---|
| | *High* | *Moderate* | *Less* | BaBe | NaRi | |
| Poor | 39,73 | 41,25 | 28,57 | 37,40 | 33,58 | 35,47 |
| Near Poor | 23,29 | 13,75 | 7,14 | 25,19 | 2,24 | 13,58 |
| Non Poor | 36,99 | 45,00 | 64,29 | 37,40 | 64,18 | 50,94 |
| (p) $\chi^2$ test | 0,001 | | | 0,000 | | |

## Household satisfaction with social relationship

| Indicator | Livelihood strategies | | | Grand |
|---|---|---|---|---|
| | *High* | *Moderate* | *Less* | |
| *Average (points)* | 2.93 | 3.29 | 3.43 | 3.25 |
| *Totally dissatisfied (%)* | 2.74 | 1.25 | 0.89 | 1.51 |
| *Dissatisfied (%)* | 28.77 | 11.25 | 11.61 | 16.23 |
| *Normal (%)* | 42.47 | 50.00 | 37.50 | 42.64 |
| *Satisfied (%)* | 24.66 | 32.50 | 43.75 | 35.09 |
| *Totally satisfied (%)* | 1.37 | 5.00 | 6.25 | 4.53 |
| *(p) $\chi^2$ Test* | 0.01 | | | - |

## Social relationship Development

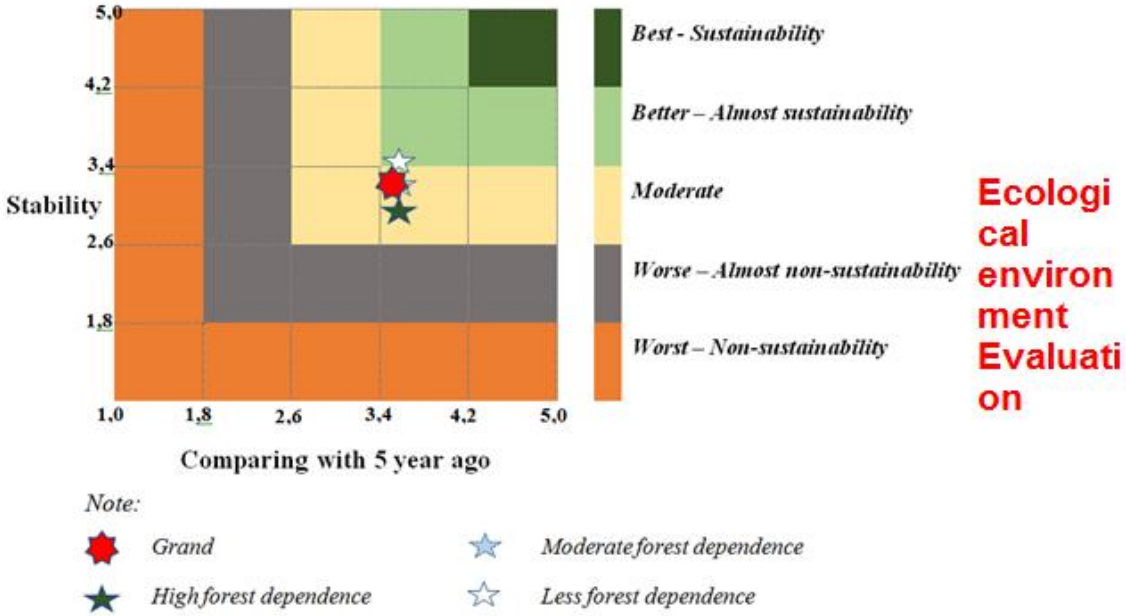
| Indicators | | Livelihood strategies | | | Grand |
|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | |
| Household income comparing with 5 year ago | *Average (points)* | 2.95 | 3.54 | 3.63 | 3.41 |
| | *Much smaller (%)* | 4.11 | 2.50 | 5.36 | 4.15 |
| | *Little smaller (%)* | 34.25 | 7.50 | 8.04 | 15.09 |
| | *Non-change (%)* | 27.40 | 33.75 | 26.79 | 29.06 |
| | *Little bigger (%)* | 31.51 | 46.25 | 38.39 | 38.87 |
| | *Much bigger (%)* | 2.74 | 10.00 | 21.43 | 12.83 |
| | *(p) $\chi^2$test* | 0.00 | | | - |
| Stable level of household income | *Average (points)* | 2.82 | 3.44 | 3.70 | 3.38 |
| | *Totally non-stable (%)* | 15.07 | 3.75 | 2.68 | 1.51 |
| | *Non-stable (%)* | 23.29 | 7.50 | 9.82 | 7.92 |
| | *Normal (%)* | 32.88 | 40.00 | 24.11 | 16.23 |
| | *Stable (%)* | 21.92 | 38.75 | 41.96 | 25.66 |
| | *Totally stable (%)* | 6.85 | 10.00 | 21.43 | 13.21 |
| | *(p) $\chi^2$test* | 0.00 | | | - |




**Social relation -ship Evalua-tion**

## Ecological environment Development

| Indicators | | Livelihood strategies | | | Grand |
|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | |
| Household income comparing with 5 year ago | *Average (points)* | 3.64 | 3.76 | 3.68 | 3.70 |
| | *Much smaller (%)* | 0.00 | 5.00 | 4.46 | 3.40 |
| | *Little smaller (%)* | 13.70 | 6.25 | 9.82 | 9.81 |
| | *Non-change (%)* | 30.14 | 28.75 | 28.57 | 29.06 |
| | *Little bigger (%)* | 34.25 | 27.50 | 26.79 | 29.06 |
| | *Much bigger (%)* | 21.92 | 32.50 | 30.36 | 28.68 |
| | *(p) $\chi^2$test* | 0.40 | | | - |
| Stable level of household income | *Average (points)* | 3.07 | 3.19 | 3.38 | 3.24 |
| | *Totally non-stable (%)* | 4.11 | 1.25 | 2.68 | 2.64 |
| | *Non-stable (%)* | 20.55 | 21.25 | 16.96 | 19.25 |
| | *Normal (%)* | 43.84 | 41.25 | 31.25 | 37.74 |
| | *Stable (%)* | 27.40 | 30.00 | 37.50 | 32.45 |
| | *Totally stable (%)* | 4.11 | 6.25 | 11.61 | 7.92 |
| | *(p) $\chi^2$test* | 0.34 | | | - |




**3.3. Factor effecting on livelihood outcome**

3.4. ***Vulnerability***

3.5. ***Livelihood capital***

3.6. ***Human capital***

3.7. ***Financial capital***

3.8. ***Natural capital***

3.9. ***Social capital***

3.10. ***Physical capital***

| Indicators | | Unit | Livelihood strategies | | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|---|
| | | | *High* | *Mode rate* | *Less* | Poor | Non poor | |
| No. HHs members | TB | PP/HHs | 4,63 | 4,49 | 4,77 | 4,15 | 4,92 | 4,65 |
| | (p) T-test | | | 0,405 | | 0,000 | | |
| No. HHs labors | TB | LB/HHs | 2,99 | 2,98 | 3,22 | 2,63 | 3,33 | 3,08 |
| | (p) T-test | | | 0,263 | | 0,000 | | |
| HHs Head education | Below primary | % | 10,96 | 8,75 | 2,68 | 9,57 | 5,26 | 6,79 |
| | Primary | % | 46,58 | 41,25 | 20,54 | 42,55 | 29,24 | 33,96 |
| | Secondary | % | 34,25 | 27,50 | 41,07 | 31,91 | 36,84 | 35,09 |
| | Above secondary | % | 8,22 | 22,50 | 35,71 | 15,96 | 28,65 | 24,15 |
| | (p) $\chi^2$ test | | | 0,000 | | 0,026 | | |
| HHs Head Gender | Male | % | 93,15 | 93,75 | 95,54 | 92,55 | 95,32 | 94,34 |
| | Female | % | 6,85 | 6,25 | 4,46 | 7,45 | 4,68 | 5,66 |
| | (p) $\chi^2$ test | | | 0,0761 | | 0,351 | | |
| HHs Head year old | TB | Year | 46,96 | 43,70 | 42,53 | 40,68 | 45,98 | 44,10 |
| | (p) T-test | | | 0,018 | | 0,000 | | |
| HHs member year old | TB | Year | 28,74 | 27,26 | 27,52 | 23,64 | 30,05 | 27,77 |
| | (p) T-test | | | 0,604 | | 0,000 | | |
| Training class participation | Rarely | % | 21,92 | 13,75 | 14,29 | 21,28 | 13,45 | 16,23 |
| | Sometimes | % | 8,22 | 17,50 | 13,39 | 18,09 | 10,53 | 13,21 |
| | Usually | % | 69,86 | 68,75 | 72,32 | 60,64 | 76,02 | 70,57 |
| | (p) $\chi^2$ test | | | 0,330 | | 0,031 | | |

Human capital

## *3.3.1. Vulnerability context*

| | *no crisis* | *moderate crisis* | *severe crisis* |
|---|---|---|---|
| Disaster | 97.74 | 1.88 | 0.38 |
| Crop failure | 65.41 | 24.06 | 10.53 |
| Serious illness | 76.32 | 12.03 | 11.65 |
| Land loss | 99.25 | 0.38 | 0.38 |
| Major livestock loss | 88.72 | 8.27 | 3.01 |
| Other major asset loss | 97.37 | 1.50 | 1.13 |
| unexpectedly large expenditures | 78.95 | 16.54 | 4.51 |
| Other | 96.99 | 2.26 | 0.75 |

| Indicators | | Livelihood strategies | | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | Poor | Non poor | |
| Invitation for Training class participation | Rarely | 39,73 | 26,25 | 23,21 | 38,30 | 23,39 | 28,68 |
| | Sometimes | 20,55 | 25,00 | 25,00 | 26,60 | 22,22 | 23,77 |
| | Usually | 39,73 | 48,75 | 51,79 | 35,11 | 54,39 | 47,55 |
| | (p) $\chi^2$ test | | 0,180 | | 0,007 | | |
| Participation in forest patrol | Yes | 67,12 | 55,00 | 47,32 | 59,57 | 52,63 | 55,09 |
| | No | 32,88 | 45,00 | 52,68 | 40,43 | 47,37 | 44,91 |
| | (p) $\chi^2$ test | | 0,030 | | 0,277 | | |
| Local people trust | No | 20,55 | 15,00 | 13,39 | 15,96 | 15,79 | 15,85 |
| | Yes | 79,45 | 85,00 | 86,61 | 84,04 | 84,21 | 84,15 |
| | (p) $\chi^2$ test | | 0,415 | | 0,971 | | |
| Getting help from other | Rarely | 12,33 | 3,75 | 3,57 | 6,38 | 5,85 | 6,04 |
| | Sometimes | 24,66 | 16,25 | 9,82 | 23,40 | 11,70 | 15,85 |
| | Usually | 63,01 | 80,00 | 85,71 | 70,21 | 81,87 | 77,74 |
| | (p) $\chi^2$ test | | 0,003 | | 0,042 | | |

**Social capital**

| Indicators | Unit | Livelihood strategies | | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | Poor | Non poor | |
| Agri-land | Mean ha | 0,50 | 0,48 | 0,53 | 0,37 | 0,58 | 0,51 |
| | (p) T-test | | 0,571 | | 0,000 | | |
| Forest land | Mean ha | 2,11 | 1,60 | 5,64 | 2,69 | 3,87 | 3,45 |
| | (p) T-test | | 0,000 | | 0,251 | | |
| Other land | Mean ha | 0,05 | 0,06 | 0,15 | 0,11 | 0,09 | 0,10 |
| | (p) T-test | | 0,078 | | 0,769 | | |
| Total land area | Mean ha | 2,66 | 2,15 | 6,32 | 3,16 | 4,54 | 4,05 |
| | (p) T-test | | 0,000 | | 0,183 | | |
| Distance to the nearest forest in km | Mean km | 1,13 | 1,04 | 1,14 | 1,18 | 1,07 | 1,11 |
| | (p) T-test | | 0,867 | | 0,603 | | |
| Distance to the nearest forest in minute | Mean phút | 19,66 | 20,06 | 22,23 | 19,57 | 21,58 | 20,87 |
| | (p) T-test | | 0,808 | | 0,574 | | |
| Distance to commune center in km | Mean km | 3,92 | 3,70 | 3,57 | 3,50 | 3,82 | 3,71 |
| | (p) T-test | | 0,208 | | 0,064 | | |
| Distance to local market in km | Mean km | 7,92 | 10,73 | 9,46 | 9,69 | 9,27 | 9,42 |
| | (p) T-test | | 0,018 | | 0,598 | | |
| Access to clean water | Mean % | 0,75 | 0,61 | 0,62 | 0,57 | 0,70 | 0,65 |
| | (p) T-test | | 0.106 | | 0.053 | | |

**Natural capital**

## Physical capital

| Indicators | | Unit | Livelihood strategies | | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|---|
| | | | *High* | *Moderate* | *Less* | Poor | Non poor | |
| **Housing situation** | *Permanent* | % | 30,14 | 37,50 | 53,57 | 29,79 | 49,12 | 42,26 |
| | *Semi-permanent* | % | 68,49 | 55,00 | 42,86 | 60,64 | 49,71 | 53,58 |
| | *Temporary home* | % | 1,37 | 7,50 | 3,57 | 9,57 | 1,17 | 4,15 |
| | *(p) $\chi^2$ test* | | | 0,004 | | 0,000 | | |
| **Chất lượng nhà ở** | *Good* | % | 13,70 | 12,50 | 19,64 | 6,38 | 21,05 | 15,85 |
| | *Normal* | % | 76,71 | 78,75 | 69,64 | 68,09 | 77,78 | 74,34 |
| | *Bad* | % | 9,59 | 8,75 | 10,71 | 25,53 | 1,17 | 9,81 |
| | *(p) $\chi^2$ test* | | | 0,630 | | 0,000 | | |
| **Value of HH non-productive assets** | *Mean* | Points | 22,97 | 26,64 | 38,30 | 17,86 | 37,54 | 30,56 |
| | *(p) T-test* | | | 0,000 | | 0,000 | | |
| **Value of HH productive assets** | *Mean* | Points | 14,49 | 16,20 | 19,16 | 11,79 | 19,84 | 16,98 |
| | *(p) T-test* | | | 0,010 | | 0,000 | | |

## Financial capital

| Indicators | | Livelihood strategies | | | Poverty | | Grand |
|---|---|---|---|---|---|---|---|
| | | *High* | *Moderate* | *Less* | Poor | Non poor | |
| **HHs income reaches basic need** | *No* | 35,62 | 26,25 | 19,64 | 42,55 | 16,96 | 26,04 |
| | *reasonable (just about sufficient)* | 42,47 | 42,50 | 27,68 | 34,04 | 37,43 | 36,23 |
| | *Yes* | 21,92 | 31,25 | 52,68 | 23,40 | 45,61 | 37,74 |
| | *(p) $\chi$2 test* | | 0,000 | | 0,000 | | |
| **Number of income sources** | *> 4* | 72,60 | 50,00 | 27,68 | 58,51 | 40,35 | 46,79 |
| | *4* | 20,55 | 38,75 | 44,64 | 32,98 | 38,01 | 36,23 |
| | *5* | 6,85 | 11,25 | 27,68 | 8,51 | 21,64 | 16,98 |
| | *(p) $\chi$2 test* | | 0,000 | | 0,004 | | |
| **% HHs has stable income labor** | *Mean* | 5,48 | 18,75 | 48,21 | 9,57 | 37,43 | 27,55 |
| | *(p) T-test* | | 0,000 | | 0,000 | | |
| **% HHs has savings** | *Mean* | 2,74 | 8,75 | 18,75 | 2,13 | 16,37 | 11,32 |
| | *(p) T-test* | | 0,002 | | 0,000 | | |
| **% HHs is in dept** | *Mean* | 68,49 | 81,25 | 78,57 | 78,72 | 75,44 | 76,60 |
| | *(p) T-test* | | 0,145 | | 0,542 | | |

## Conclusions

- The livelihoods of the high dependency groups and poor households are still limited
- High forest dependency and low income
- Household income is relatively low, average income is 34.4 million VND / year, average income per capita is about 600 thousand VND / month.
- Livelihoods have a clear impact on household income. In particular, the group of financial and human resources has the most influence. This result implies that households can improve their income by improving their livelihoods capital
- Education and training, vocational training, handicraft development, non-agricultural forestry, diversification of credit support
- Building village culture, community solidarity, harmony, trust and help each other
- Effective forest land allocation, avoiding encroachment and overlapping property
- Reducing the Household dependency on the forest, there should be solutions to support the development of non-forestry industries such as cultivation and animal husbandry rather than exploiting forest resources

# FROM HUNTING-GATHERING TO INDUSTRIAL ECONOMY: ANALYSIS OF LIVELIHOODS CHANGE OF PUNAN DAYAK COMMUNITIES IN EAST KALIMANTAN, INDONESIA

**Ms.Dyah Ita Mardiyaningsih**

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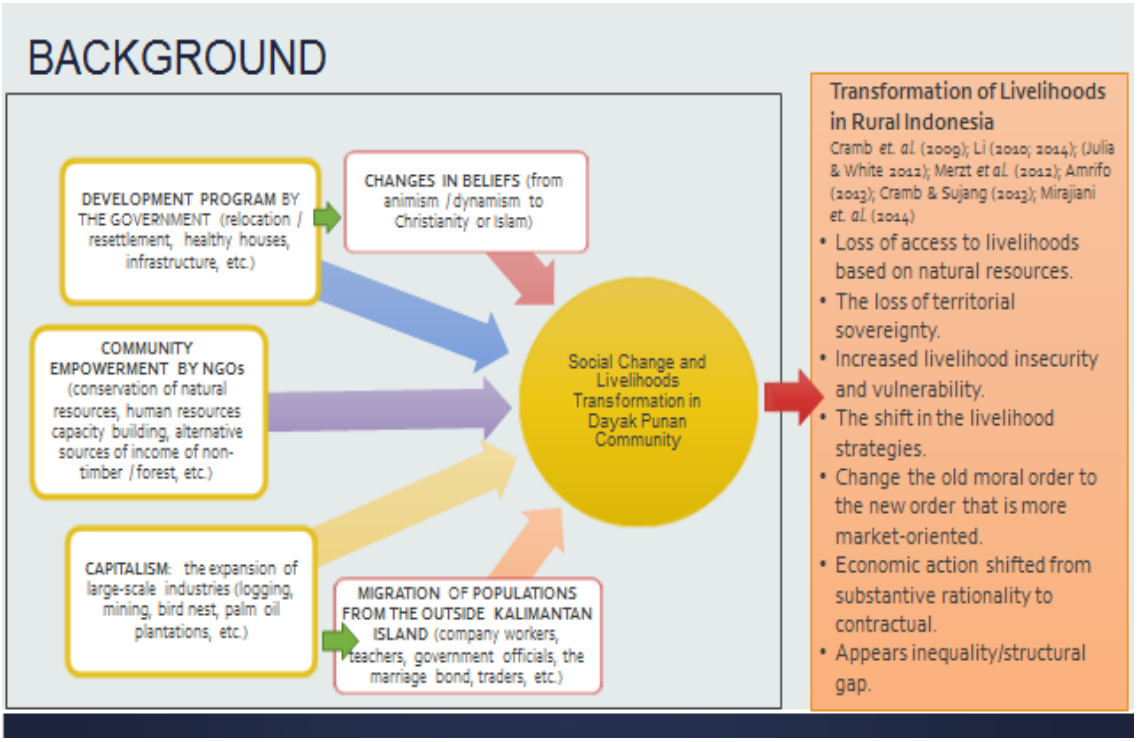
*Dr. Martin Reinhardt Nielsen*

**Abstract**

Rural communities generally depend their livelihoods from natural resources by hunting-gathering activities, as Punan Dayak communities did in Kalimantan. However, the dynamics of economic development has, slowly but surely, resulted in dramatic social change of rural communities. Punan Dayak communities are without no exception also undergoing dramatic change, particularly its livelihoods system. The change began short after the resettlement program that was promoted by the government. They gradually put themselves as sedentary fallow farming system, forest-resources extraction activities are still obvious though its role became very insignificant. Recent NGO report confirmed that the states of economic situation of Punan Dayak communities has gradually change to become socio-economically critical and marginalized. The available livelihood sources has become very limited to the communities. Simultaneously, serious deforestation and forest degradation hits the communities as large-scale agricultural enterprises came to invest and expand their capital in the region, has also brought about loss of traditional livelihoods sources from the forest. It is important to mention that the development of oil palm plantation drove land use change that made the livelihood system of indigenous communities has been totally altered and devastated. With these changes, Punan Dayak communities are forced to face with other option of livelihoods strategist and finding out new sources of livelihood sources to survive. The problem is, not all alternative sources of livelihood are easily available, as well as accessible to them. Even if they are accessible, the limited number of sources of livelihood has made the quality of their livelihood resilience and sustainability can no longer as good as in the past. This condition occurs in two types of Punan Dayak communities in Berau District of East Kalimantan Province of Indonesia. Two villages that are in common of origin and are located side by side, are compared. The research showed a very surprising result where the

livelihood choice is absolutely different. They also implement different livelihood strategies. Their interest to land resources are also different. One community is very aggressive of occupying land where the other community is rather conservative in land occupation. This has then led to the agrarian-tenurial conflict as their expressions of controlling the land are different. The Punan Dayak Community of Merabu Village choose to maintain forest land as the main income source by developing rural ecotourism business while maintaining traditional farming system. On the contrary, Punan Dayak Community of Merapun Village choose to receive investments of oil palm plantation companies and become plasma of the company's nucleus-plasma partnership scheme. Most of them are encouraged to work as formal laborers in the plantations. The intervention from other actors from public, private and NGO is the other typical and important characteristic of this community. The role of customary institutions determining land use has also change, dramatically. The role of local institutions are paralyzed gradually somehow. That is what happened in two Punan Daayak communities that have chosen two different livelihood strategies due to the arrival of modernities development and economic development activities in the region.

***Key words:*** *livelihoods strategies, livelihood sustainability, local institution, ecotourism, oil palm plantation*



## METHODOLOGY-Mix Method

- Time: January-February 2015 (Survey Phase I); August-September 2016 (Survey Phase II)
- Location: Kelay Sub District, Berau District, East Kalimantan Province, Indonesia

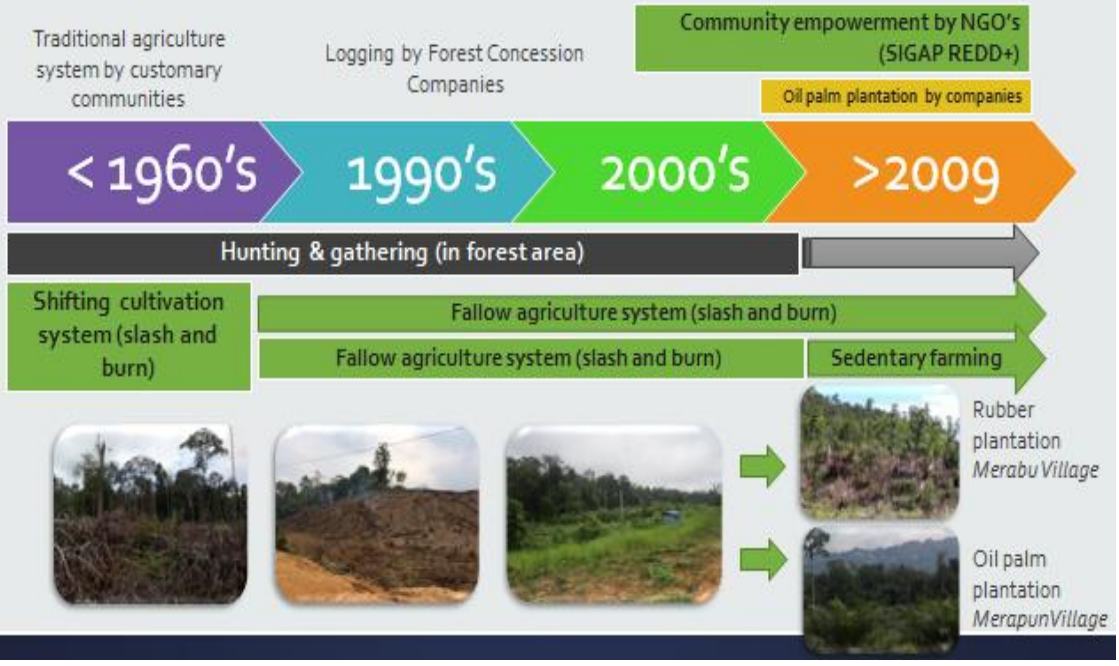
  Merabu Village: 44 households (areas: 389,55 km²/52 households)

  Merapun Village: 31 (2015)- 51 (2016) households (areas: 720,20 km²/328 households)
- Research Methods

  Qualitative: in-depth interviews, literature review, case studies

  Quantitative: households survey


## LAND USE CHANGE BY SMALLHOLDER



# AFTER LAND USE CHANGE ????


ECONOMIC
SOCIAL
ECOLOGY
?

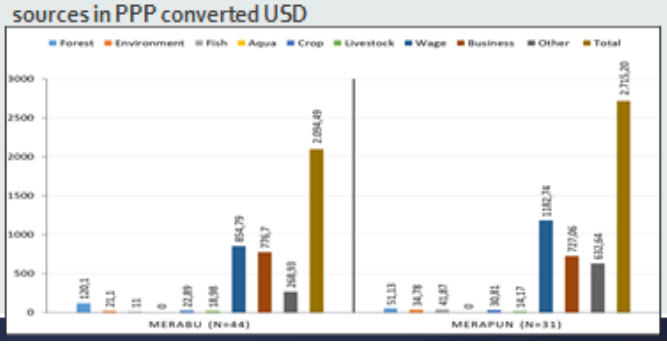
# Economic

- The source of income from the extraction of natural resources and agriculture is decreasing
- There is a new source of livelihood for the household:
  Merabu: Ecotourism
  Merapun: Plantation workers
- The household income increasingly rely on income from wages and business → MORE DEPENDS ON OTHERS
- The existence of new sources of livelihood does not encourage households to make a livelihoods diversification strategy → A TENDENCY OF DOMINATION OF LIVELIHOOD (Simsons Diversity Index < 0,1)

Changes in livelihood sources of households, over the last10 years

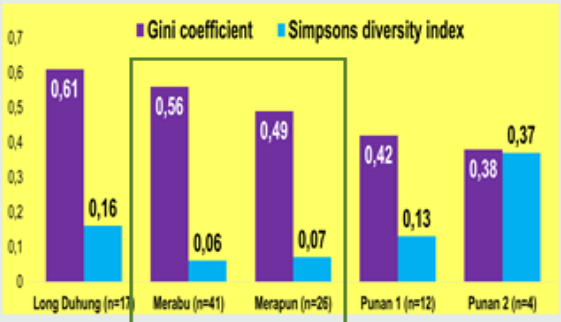
| Source of Incomes | Merabu | | | | Merapun | | | |
|---|---|---|---|---|---|---|---|---|
| | 2006 | | 2016 | | 2006 | | 2016 | |
| | n | % | n | % | n | % | n | % |
| Forest and environment | 8 | 44,37 | 5 | 26,52 | 7 | 35,79 | 1 | 6,10 |
| Agriculture | 5 | 27,29 | 4 | 19,57 | 4 | 22,54 | 3 | 16,80 |
| Livestock | 1 | 4,07 | 1 | 5,33 | 1 | 2,88 | 1 | 3,10 |
| Fisheries | - | - | 0 | 0,33 | - | - | - | - |
| Wage | 4 | 22,76 | 7 | 38,59 | 6 | 34,51 | 10 | 52,20 |
| Bussiness and trade | 0 | 0,70 | 2 | 9,24 | 1 | 3,74 | 1 | 5,30 |
| Others | 0 | 0,81 | 1 | 5,43 | 0 | 0,53 | 3 | 16,50 |
| TOTAL | 19 | 100 | 20 | 100 | 19 | 100 | 20 | 100 |

Mean household gross income per AEU by village from different sources in PPP converted USD



## Social

- The commercialization in the village increased – the community togetherness activities decreased
- The income gap among households in the community increased → **JEALOUSY BETWEEN THE RICH AND POOR become wider**
- The role of local institutions are paralyzed gradually somehow:
  Merabu: establish new local institutions ("KERIMA PURI") to manage the forest and ecotourism → **REDUCE THE ROLE OF VILLAGE GOVERNMENT AND CUSTOMARY INSTITUTION**
  Merapun: The decision of customary leaders followed no longer on the basis of obedience, but to gain economic benefits → **PRACTICAL RATIONALITY**
- Agrarian conflict between Merabu and Merapun Villages → village boundaries




Sources: Mardiyaningsih, 2015

## Ecology

**MERABU VILLAGE**

- Make a legal status of Merabu Village Forest by acquiring a legal document (SK Hutan Desa No. 28 / Menhut-II / 2014)
- Inspiring Actions by Communities for Change in REDD+ (SIGAP REDD+) by TNC encourage **BETTER MANAGEMENT OF LAND AND FORESTS** → second winner for village forest management at the national level

**MERAPUN VILLAGE**

- The deforestation increases → **THE COMMUNITY AND HOUSEHOLDS TEND TO SELL LAND EASILY**
- The water crisis increases
- The air pollution (smoke) increases

## CONLUSION

- Merabu is ecologically more resilient than Merapun; so in the long run the household livelihood systems more secure. But social and economic vulnerabilities need to be alerted to avoid the conflicts in the future.
- The industrial economy is driving the shifting cultivation system to sedentary agriculture; which means that access to the land becomes more and more easy. But **WHO GOT THE BENEFITS OF THE LAND?**

# THE ROLE OF COMMUNITY FOREST FOR RURAL LIVELIHOODS: CASE OF MERABU VILLAGE

**Arya Hadi Dharmawan & Dyah Ita Mardiyaningsih**

## Abstract

The need for coping with green house gases, carbon emission, and ecological landscape change, has brought the global idea of climate change mitigation using REDD+ as on of its instrument. Though, it is not simple to implement REDD+ scheme, but effort should be made. One of critical problems of REDD+ implementation is the fact about overlapping claim of a piece of land that occurs to be problematic particularly when calculating benefit sharing. Community forest, may be one of that effort towards achieving REDD+ implementation that less problematic with land tenure difficulties. Despite tension regarding the methodology of carbon measurement that never ends as well as lack of governance support (benefit sharing mechanism) for carbon credit/payment that always be in debate, community forest has in many places has proven itself as being effective in supporting carbon accumulation of a certain region. Community forest provides the rural community not only with carbon to be credited in REDD+ scheme but also non-timber forest products that economically substantial to support rural livelihood. This article, sees how effective Merabu Village in East Kalimantan may be promoted as "REDD+ pilot" community forest, after having been granted the so-called Hutan Desa amounting to ca. 8000 ha of forest from the central government. This article sees Merabu Village can be a model of community forest supportive to REDD+ in East Kalimantan. However, there still challenges need to do in the future, among others are setting up local institutions necessary to support carbon credit scheme, increasing capacity of the local traditional people in managing the community forest, and building up trust that community forest is able to achieve sustainable forest management system.

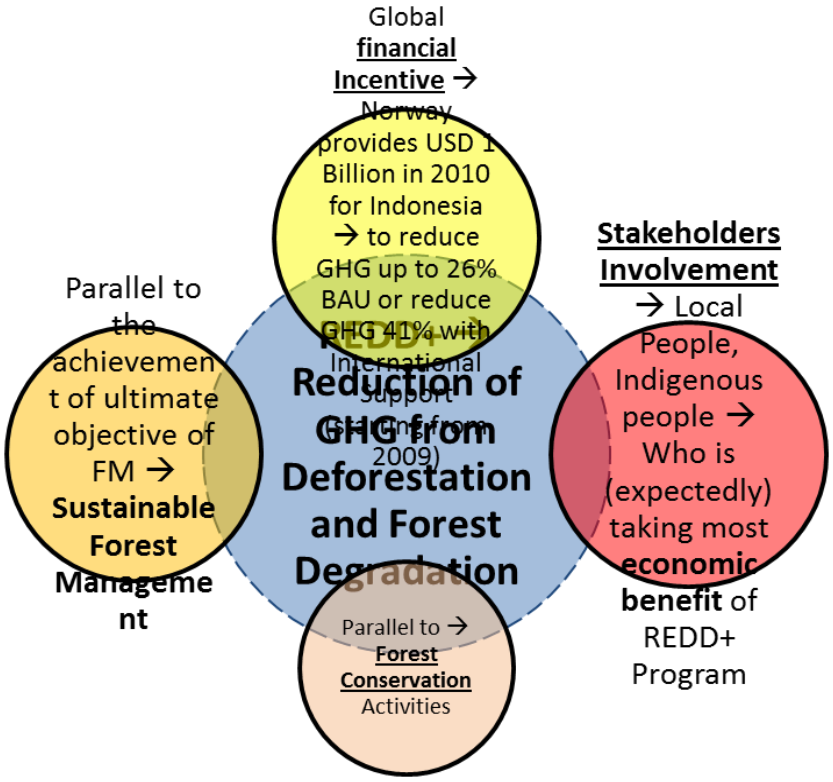
***Key-words:*** *community forest, REDD+, rural livelihood, Merabu Village*

## Some Challenges on REDD+ related Forest Management Issues in Indonesia

- Rate of land cover change – ***Forest Landscape Change*** *into Oil Palm Plantation* → 500.000 Ha per year → (leading to) DEFORESTATION is unbelievable high → **REDD+ is not fully able to address this (destructive) trend**.
- Indonesia has been facing **difficulty to implement REDD+** since its inception (2009/2010) → The issues are:
    - (1) **MRV** (Monitoring, Reporting & Verification)

- (2) **REL** (Reference Emission Level)
- (3) **Safeguarding** Mechanism
- (4) (the absence of) national **strategic policy** on REDD+ (Central Kalimantan and Jambi Provinces → are still not clear enough to implement REDD+).

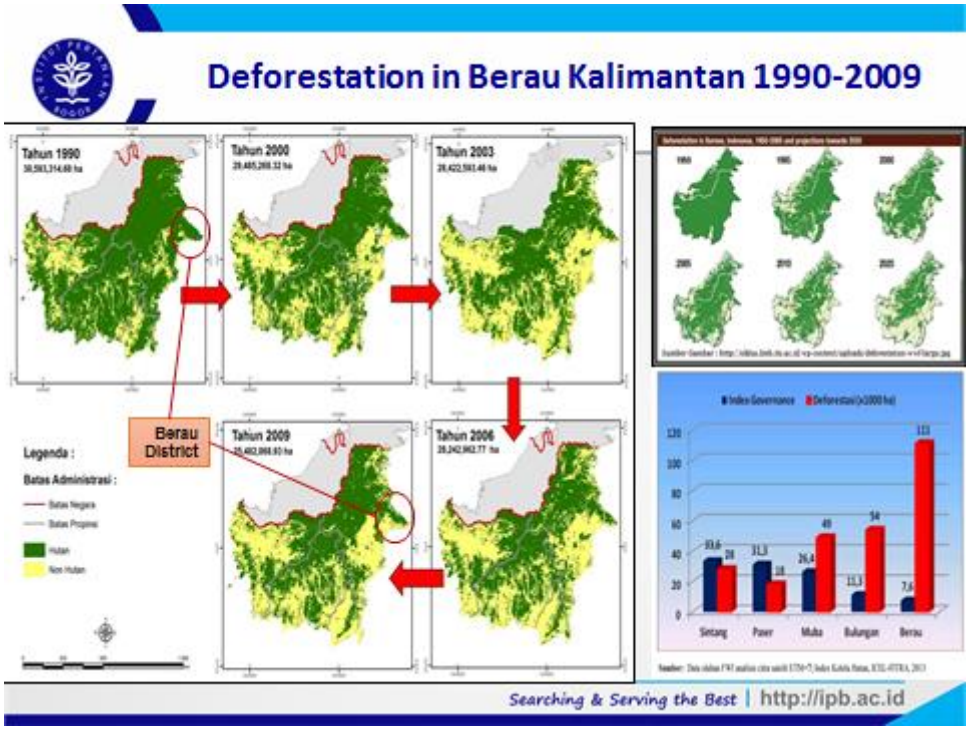
- **REDD+ → Reduction of GHG from Deforestation and Forest Degradation**
- Global **financial Incentive** → Norway provides USD 1 Billion in 2010 for Indonesia → to reduce GHG up to 26% BAU or reduce GHG 41% with International Support (starting from 2009)
- **Stakeholders Involvement** → Local People, Indigenous people → Who is (expectedly) taking most **economic benefit** of REDD+ Program
- Parallel to → **Forest Conservation** Activities
- Parallel to the achievement of ultimate objective of FM → **Sustainable Forest Management**

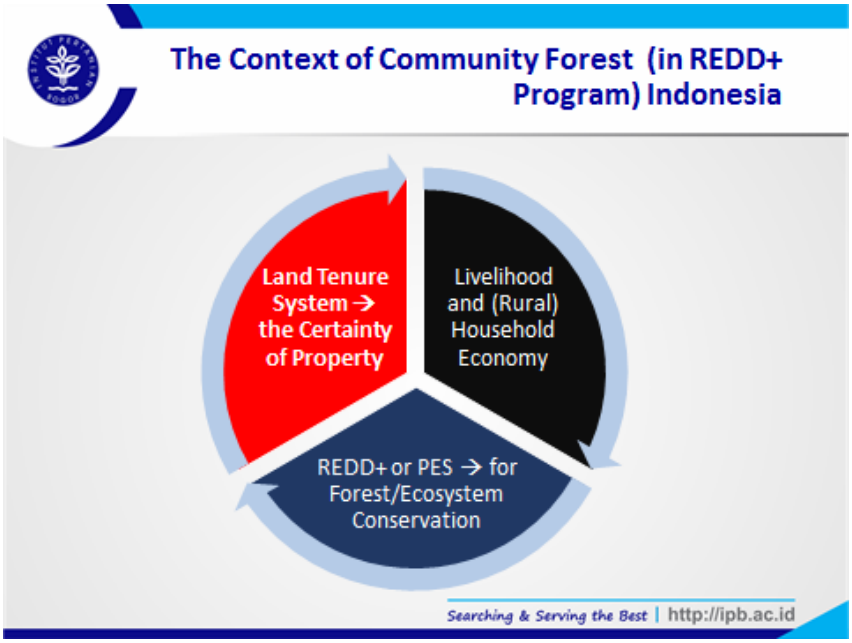



**Debating Issues on (REDD+ related) to Community Forest**

1. Community Forest (CF) → support **rural livelihoods**
2. CF is **potential for REDD+** implementation → but small growth of carbon accumulation

3. Does CF have good impact on the **reduction of rural poverty**?
4. **Benefit sharing (among people) is operationalized** (since land-property is not only on the hand of local people) → ecosystem based
5. **Local institution** (for the REDD+ implementation) is established and strengthened.



**Research Questions**

1. How complex is the *land* (*tenure*)-related to community forest for local people?
2. How big the community forest can contribute to support *livelihood and household economy*?
3. How big is the potentiality of community forest to support *climate change mitigation* via REDD+ program (vs PES)?


**Research Strategies**

Research Approaches:

- **Qualitative Research**

  in-depth interviews, literature review, case studies
- **Quantitative Research**,

  Structured interviews, In-depth Interviews

**Time and Location**

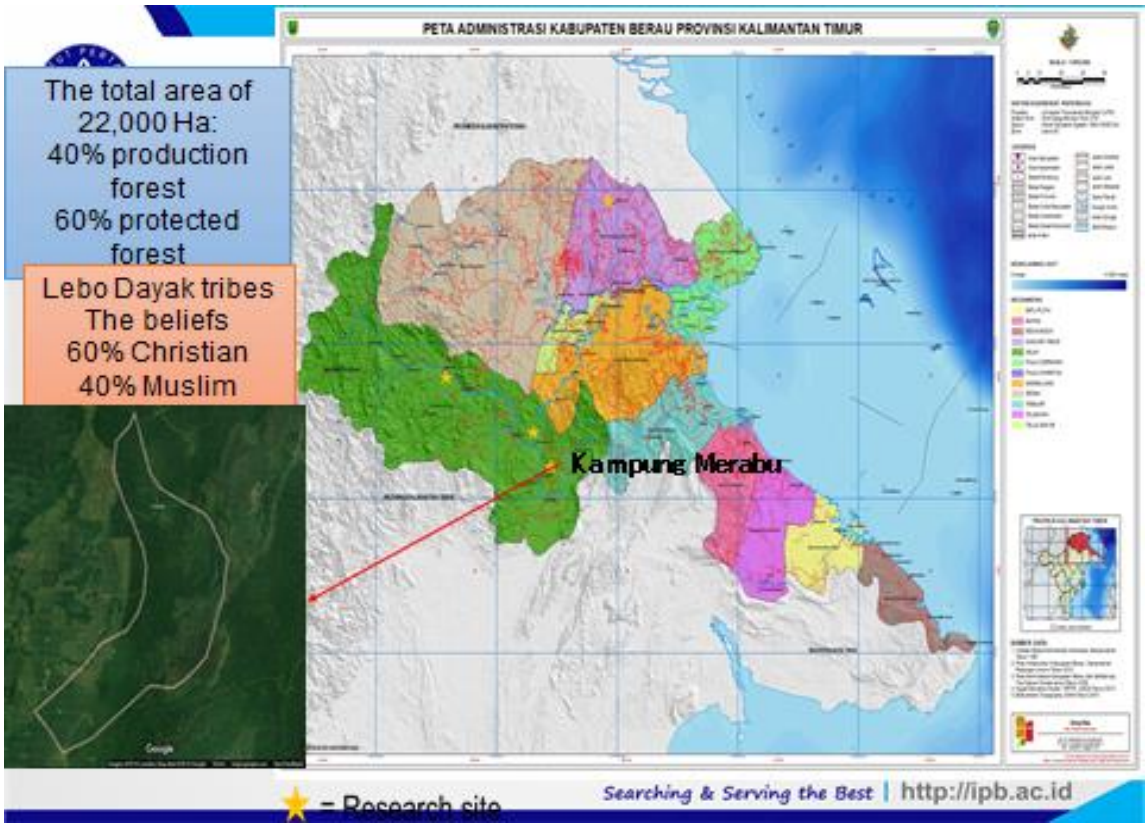
- Time Frame

  January-February 2015 (Survey Phase I); August-September 2016 (Survey Phase II) → **Data are already ready in 2016/2017**

- Research-Location

Merabu Village, *Kelay* Sub-District, *Berau* District, East Kalimantan Province, Indonesia

Respondent = 44 households from 55 households

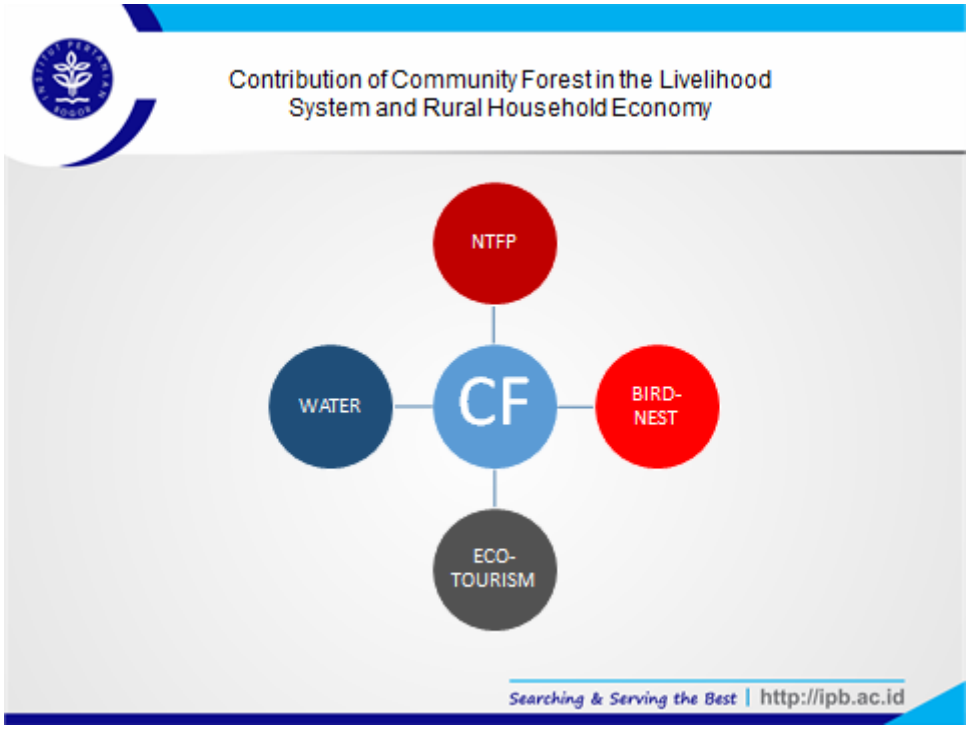



**Research Findings**

**Objectives: THE COMPLEX OF LAND TENURE SYSTEM LINKED TO THE COMMUNITY FOREST**

- Karst Mountain - Hilly Area dominated by Karst
- Total surface area → 22.000 Hectares
- The area is divided into:
  - Forest Concession belonging to a company → **11.300 Ha**
  - Protected Forest Area → 10.800 Ha → inside of the Protected Areas, there is **Community Forest** belonging to the Village → **8.245 Ha**
  - Agricultural Areas → 59 hectares
  - Rubber plantation belonging to the smallholders: 100 hectares (2 Ha/Household)
  - Agro-pastoral areas → 25 Hectares


**THE CONTRIBUTION OF COMMUNITY FOREST IN THE LIVELIHOOD & (RURAL) HOUSEHOLD ECONOMY**



## Livelihood Changes → 2006-2016 at *Merabu* Village → *Loosening dependency on forest resources* → Good for the Forest

| Source of incomes | 2006 | | 2016 | |
|---|---|---|---|---|
| | n | % | n | % |
| Forest and environment | 8,30 | 44,37 | 5,30 | 26,52 |
| Agriculture | 5,11 | 27,29 | 3,91 | 19,57 |
| Livestock | 0,76 | 4,07 | 1,07 | 5,33 |
| Fisheries | - | - | 0,07 | 0,33 |
| Wage | 4,26 | 22,76 | 6,72 | 33,59 |
| Ecoturisme, bussiness and trade | 0,13 | 0,70 | 1,85 | 9,24 |
| Others | 0,15 | 0,81 | 1,09 | 5,43 |
| TOTAL | 18,72 | 100,00 | 20,00 | 100,00 |



## The potential of ecotourism as a source of household livelihood


Rent car


Rent boat


Home-stay


Handi crafts


Stall


Tourist Guide


Selling local product

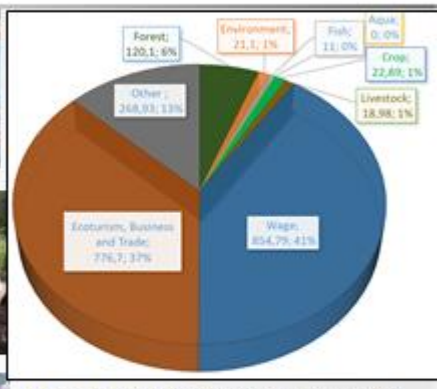
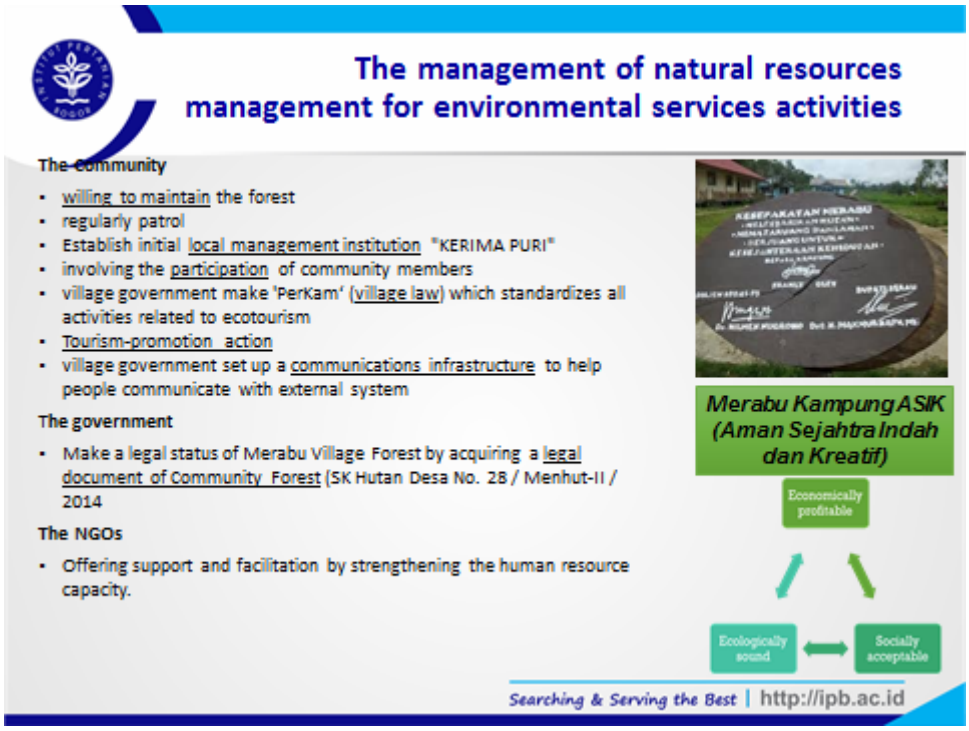



Figure of mean household gross income per AEU from different sources in IDR converted USD (2015)

**THE CONTRIBUTION OF COMMUNITY FOREST IN THE CLIMATE CHANGE MITIGATION via REDD+**




**Concluding Remarks**

- Community Forest is actually REDD+ ready.
- PES Economic System has been running very well.
- Forest Management Institution complying with REDD+ → is still very weak (need help to develop)

## SECTION 6: DOES COMMUNITY MONITORING CAPTURE FOREST BIODIVERSITY

**Chairs: Dr. Henrik and Dr.Ida Theilade**
*IFRO, University of Copenhagen*

SUMMARY

This section presents how can community monitor forest biodiversity and their understanding the roles of forest species in their life.

# QUALITY OF FOLK SPECIES IDENTIFICATIONS AND THE EFFECT OF SAMPLING OF STUDY SITES, INFORMANTS AND TREES

**Søren Brofeldt*, Nerea Turreira-García*, Henrik Meilby, Martin Reinhardt Nielsen, Deden Girmansyah, Do Thi Xuyen, Iskandar Z. Siregar, Nguyen Lam, Ida Theilade**

**Co-lead authors*

**Acknowledgements**

We are grateful to the people from Ban Duong and Long Duhung for their hospitality and for sharing their knowledge and time with us. This project has been a joint collaboration between the University of Copenhagen (UCPH), the Vietnam National University of Agriculture (VNUA) and Bogor Agricultural University (IPB), funded by the FFU project (DFC No 13-08KU).

**Abstract**

While local ecological knowledge (LEK) is increasingly being used for biodiversity monitoring, a number of factors influence the quality of the field identifications provided by local informants and hence, our ability to translate between folk and scientific taxonomies. The aim of this study was to test how site, informant's profile and tree characteristics affect the consistency of folk identifications and our ability to establish the correspondence between folk and scientific taxonomies. We selected 7 and 21 informants in two villages with different livelihood strategies and access to the forest and carried out *in situ* identifications of trees in each site. We used quantitative data analysis to determine factors affecting identification rate and consistency for individual trees, species and families and we used taxonomical correspondence matrices to assess the correspondence between the Linnaean and the local taxonomies. The informants from the village with higher access and use of the forest and further distance to market were significantly more consistent in their identifications than the ones from the agriculture-based village with restrictions placed on their use of trees. In both sites, older informants and informants who actively used trees had higher probabilities of proposing identifications. Active use of the species also improved the consistency of identifications and landmark trees and trees with a higher number of characteristics used in identification, were significantly more likely to be consistently identified. Morphological and anatomical characteristics of certain families, such as Myristicaceae, Sapotaceae and Anacardiaceae influenced the identification consistency. The taxonomical correspondence matrices showed signs of both one-to-one relationships, over-estimation and under-estimation. These findings contributes

empirical evidence to inform research design and use of LEK in forest monitoring and caution that the use of key informants cannot necessarily mitigate the effect of site specific differences in LEK.

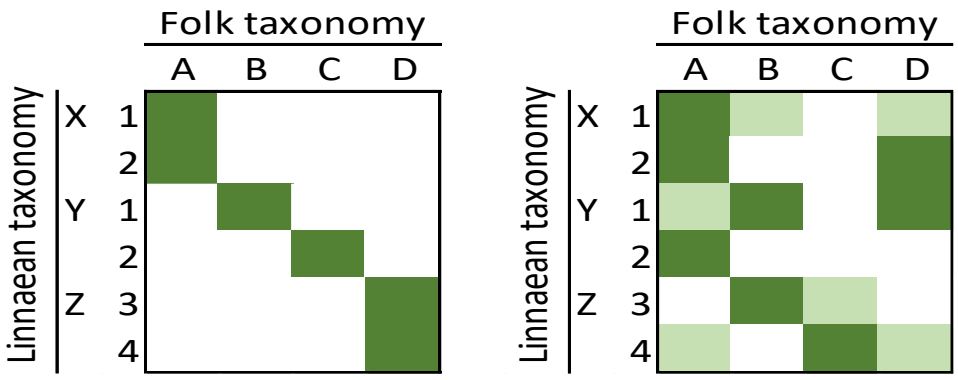
***Key words:*** *Local Ecological Knowledge, Ethnobotany, Community Based Monitoring, Forests*

**Development of the study**

- The study started as an experiment aiming to analyse the accuracy of local peoples' species identification as a basis for monitoring biodiversity (for REDD+)
- Four+ rounds of fieldwork (2014-2016)
- Botanists and local informants identified the species of trees within a plot network
- We noticed that local and scientific taxonomies were not directly comparable (no direct mapping)
- We decided to focus the study on how research design choices, such as selection of study area, informants and species, affect the quality of folk identifications

**Background**

- Local Ecological Knowledge (LEK) is increasingly being used for documenting local uses of plants, in botanical surveys, in forest surveys, …
- LEK is site specific and is not uniformly distributed within or across communities. LEK depends on age, gender, livelihoods, species use, access to forest,…
- Relating Linnaean taxonomy (based on rigid phylogenetic principles) to folk taxonomies (based on gross morphology, cultural use,…) is challenging
- Most ethnobotanical studies assume direct correspondence of taxonomies
- What is often assumed and what may be encountered.



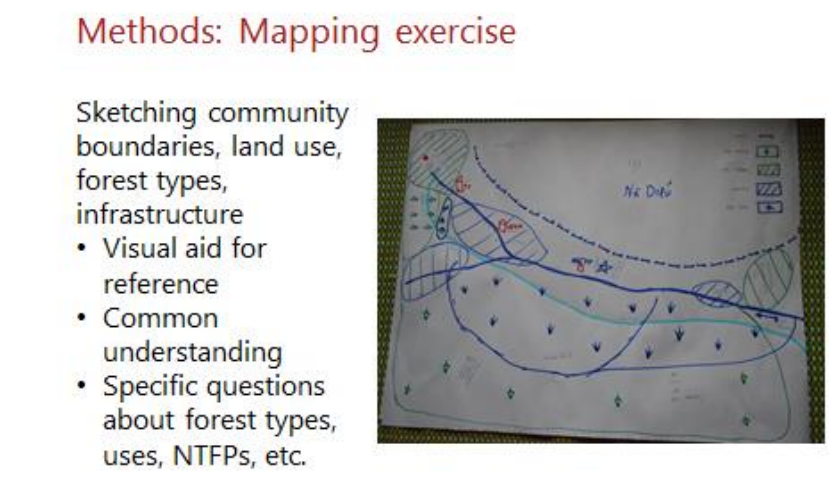
**Research problem and aim**

***Problem***

- The varying degree of LEK and the false assumption of direct mapping being possible => Misinterpretations and varying quality of representation of actual local taxonomies. This has implications for application in surveys (e.g. in relation to REDD+)

***Aim***

- To investigate how research design choices such as selection of study area, informants and species affect the quality of folk identifications

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## Methods: Plot network and survey (I)

- Select community monitors – criteria different
- Distribute plots systematically – GIS
- 28 plots in Vietnam, 32 in Indonesia

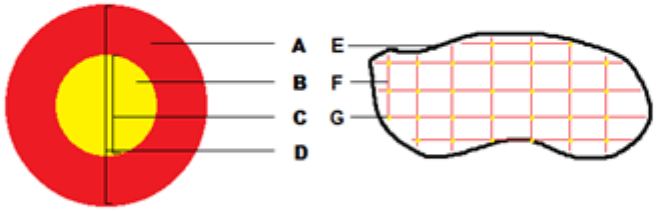


*Fig. 1. A: 9-15m area (trees >70cm circumference); B: 0-15m area (trees >30cm circumference); C: Diameter small plot - 15m; D: Diameter large plot – 30m; E: Example of ideal focal area with 30 plot locations; F: Gridlines used for plot placement; G: Grid line intersection with plot location.*

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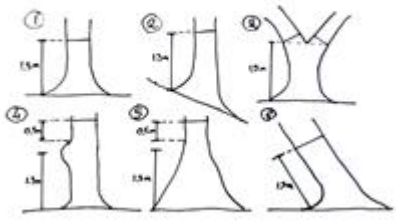
## Methods: Plot network and survey (II)

- Find plot location using GPS and local expertise
- Establish plots: mark and number trees, measure diameter and identify species using folk names
- 468 trees in Vietnam, 755 trees in Indonesia
- Identification of species by botanists (for ref.)



## Individual tree identification tests

- 21 informants in Vietnam and 7 in Indonesia
- Two key informants in each village
- Three age-strata
- 86 trees in Vietnam and 231 in Indonesia
- Identify trees using local names; physiochemical characteristics, active use, etc. used to identify each species



## Focus group discussions

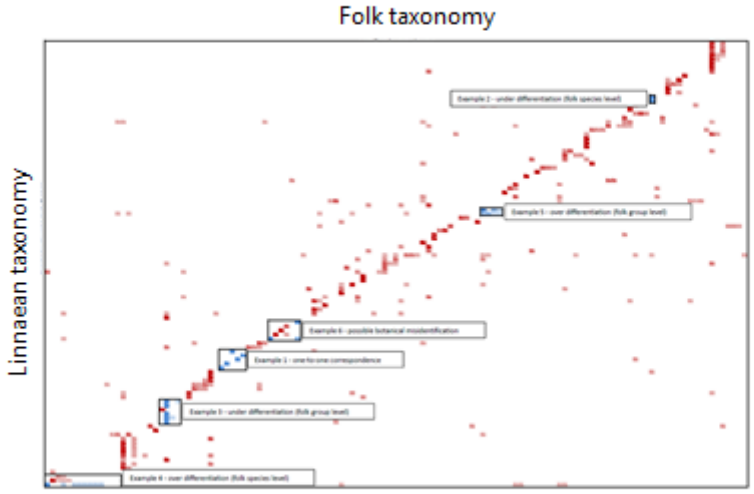
A big puzzle:
- Spelling, synonyms, varieties, groups (relations)
- Uses, meaning of names, specific characteristics

# Overview of the data - Vietnam


Low consistency of identification; low correspondence between taxonomies
Shading indicates proportion of a Linnaean species within each folk group



# Overview of the data - Indonesia




High degree of consensus and good correspondence between taxonomies
Cases of over-differentiation (One spp. = many folk spp)
Cases of under-differentiation (one folk spp. = many spp.)

**Results: Site and informants**

- We measured how many respondents provided a name for each tree (ID rate), how consistently they were named, and what variables affected the two measures
- The site in Indonesia (forest dependent people) clearly showed better ID rates and consistency than in Vietnam
- Key informants in Indonesia performed better than in Vietnam, but key informants at the site in Vietnam performed better than other informants at this site

**Species and trees**

- Age, knowing the uses of the folk species and actively using them had a positive effect on ID rate
- Active use also improved the consistency of naming
- Education did not have any significant effect
- Identification consistency improved for trees/species that were:
    - Actively used
    - With high number of identifiable characteristics
    - Known in advance for its specific location
    - Belonged to certain families
- Abundance or size appeared to have no effect

**Discussion**

- Quality of species identification by local monitors can be expected to vary a lot
- Understanding the nature of a local taxonomy is important (but achieving this understanding may be demanding)
- Direct match with Linnaean taxonomy cannot be expected
- Better results can be expected for species actively used by people
- Care is needed when selecting informants (if possible)
- Critical assessment of the nature and quality of local identifications needed

# ALTERNATIVE APPROACHES FOR COMMUNITY BIODIVERSITY MONITORING: A CASE STUDY IN DUONG VILLAGE, BA BE NATIONAL PARK

**Do Thi Xuyen[1/], Nguyen Anh Duc[1/], Dang Quoc Vu[2/], and Nerea[3/]**

*1/Vietnam National University, Hanoi*
*2/Ministry of Agriculture and Rural Development*
*3/PhD student, University of Copenhagen*

## Abstract

Forest plays very important roles for local community and global environment and ecosystem services. Ethnic people and knowledge of local people about biodiverdity, relationship bettwen people and plant is very important for protection the forest resource. For many decades, a raised question in debate is could local people identify forest biodiversity in place where they are leaving. If local farmers can do that can reduce the biodiversity monitoring cost from the government and local people have better attitude to conserve plant resources. Therefore, the objectives of this article were to assess local knowledge on plant resource in Duong village and to propose the measures for plant resource conservation in Ba Be Natinal Park, Bac Kan province, Vietnam. Forest transect walk, investigation plant following the line and perquadrate, collecting information about the plant from key informants, group discussion and local people interview were used in this study. Local people were asked the local guides to provide the Tay (or Vietnamese) name and write down the name of the local name per plot. Plant samples were collected (bark, flower, leaves, stem) and to identify scientific name of each plant.

The results reveal that local farmers rightly identified 145 per total 376 plant species (38.6%), mistake with 121 species (32.2%), unidentified 65 (17.3%), and 45 (12%) plant species could not collect samples due to too height, no flower. The scientist also identified 224 per 376 in total (59.6%), unidentified 21%, identified only for family name (75%), 12% of plant species could not collect samples due to too height, no flower. Some reasons of mistake in identification by Tay ethnic people were: (i) similarity in tree characteristics (bark, smell, flower, shape, leave color); (ii) these trees have not yet contributed to local livelihood; (iii) used name from other location with other ethnic groups (same name of tree but they were different species).

The results suggest that local farmers only know the trees, which has related to their life and less concern to plant with environmental services as mentioned by scientific communities. For enhancing quality of biodiversity monitoring, scientists should collaborate with local people in utilizing local knowledge and resources.

***Key-words:*** *Biodiversity monitoring, local name, scientific name, Duong hamlet, Ba Be National park, Vietnam*

## Introduction

Forest and the role of forest with community and environment, ecosystem

Ethnic people and knowledge of local people about biodiverdity, relationship bettwen people and plant is very important for protection the forest resource.

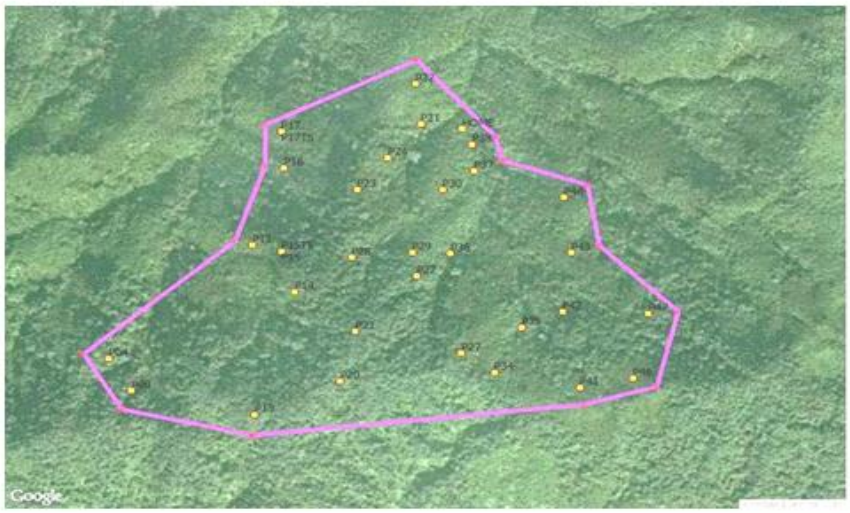
## Objectives

Assessing the knowledge of local people about plant resource in Duong village (Ba be national park)

To propose the measures of conservation the plant resource in Ba be natinal park.

## 3. Methods:

Investigation plant following the line and perquadrate, colecting information about the plant




The secondary forest

Bamboo forest

Group research 2016

Group research 2015

Building the camp

Building the camp

Đánh số cây và thu thập mẫu vật

No of Trees


Number of each plant

colecting information about the plant

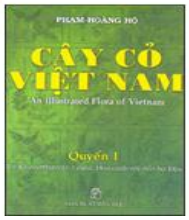
PRA method, building the questionnaire, interviewer the local people

Tay ethnic people

Ask the local guides to provide the Tay (or Vietnamese) name.
Write down the name of the local guides per plot

| Plot | Tree | Viet. name | Tay name | Family | Genus | Spp | Det. | Notes | Use(s) in Literature |
|---|---|---|---|---|---|---|---|---|---|
| 31 | 1 | Xoan đào tía | | Rosceaae | Prunus | arborea var. montana (Hook. f.) Kalkm. | Xuyen | Correct name | Local people in Ban Duong use wood for special rice basket; wood for building, agricultural equitment (Checklist of Plant in VN) |
| 31 | 2 | Xoan đào tía | Mạy jọc | Rosceaae | Prunus | arborea var. montana (Hook. f.) Kalkm. | | | Local people in Ban Duong use wood for special rice basket; wood for building, agricultural equitment (Checklist of Plant in VN) |

**Identify as latinh name in the lab**





## Results

### The Result

### 1. Tree identification by ethnic people (Tay people)

| Plot | Tree | Viet. name | Tay name | Family | Genus | Spp |
|---|---|---|---|---|---|---|
| 31 | 1 | Xoan đào tía | | Rosceaae | Prunus | arborea var. montana (Hook. f.) Kalkm. |
| 31 | 2 | Xoan đào tía | Mạy jọc | Rosceaae | Prunus | arborea var. montana (Hook. f.) Kalkm. |
| 31 | 3 | Xoan đào tía | | Rosceaae | Prunus | arborea var. montana (Hook. f.) Kalkm. |
| 31 | 4 | Ngái vàng, Sung lông | | Moraceae | Ficus | fulva Reinw. ex Blume |
| 32 | 5 | Quếch hoa chùy | Lạng cạc | Meliaceae | Chisocheton | paniculatus (Roxb.) Hiern |
| 32 | 6 | Muống truống | Lạng cạc | Rutaceae | Zanthoxylum | avicennae (Lamk.) DC. |
| 32 | 7 | Quếch hoa chùy | Lạng cạc | Meliaceae | Chisocheton | paniculatus (Roxb.) Hiern |
| 32 | 8 | Quếch hoa chùy | Lạng cạc | Meliaceae | Chisocheton | paniculatus (Roxb.) Hiern |
| 32 | 9 | Bồ đề trắng | May hu trắng | Styracaceae | Styrax | Tonkinensis |
| .... | | | | | | |

# The Result

## 1. Tree identification by ethnic people (Tay people)

| Total of Trees | Trees Identified by ethnic people | Trees misstake | Trees unidentified | Trees die or not collect the sample |
|---|---|---|---|---|
| **376** | 145 | 121 | 65 | 45 |
| 100% | 38,56 | 32,18 | 17.28 | 11.96 |

# The Result

## Some reasons of mistake in identification by ethnic people (Tay people)

**Some species in the same genus, same family (nearly the same characteristics)** → **The same name** → Confuse

Lạng cạc (Local name) → Meliaceae
Dysoxylum
Aglaia
Walsuta

Tảng tó (Local name): All species in Schefflera in Araliaceae

# The Result

## Some reasons of mistake in identification by ethnic people (Tay people)

**Some species in the same value (nearly the same characteristics)** → **The same name** → Confuse


Mắc nọt (Local name) → Moraceae
Ficus (it about nearly 20 species)
(edible)

## The Result

**Some reasons of mistake in identification by ethnic people (Tay people)**

**Some people call the same species with different species** → Confuse

Local name
Lạng cạc
Mạy chảu
Mạy mạ

→ Meliaceae
Dysoxylum oligatum

## The Result

**2. Tree identification by professional botanists**

| Total of Trees | Trees Identified until species level | Trees Identified until genus level | Trees Identified until family level | or not collect the sample |
|---|---|---|---|---|
| **376** | 224 | 79 | 28 | 45 |
| 100% | 59,57 | 21,01 | 7,45 | 11.96 |

## The Result

**2. Tree identification by professional botanists**

| Total of Trees | Trees Identified until species level | Trees identified in the field | Trees identified in the laboratory |
|---|---|---|---|
| **376** | 224 | 102 | 122 |
| 100% | 59,57 | 45,53 | 54,46 |

Flower or fruit very small

## The Result

**Some reasons of mistake in identification by professional botanists**

Sample without flower and fruit

**Tree too high**

Some problems about knowledge of local people (Tay ethnic in Duong village, Ba be national park)

**Only know the tree, which has related to their life**

**Role of plant with environment and ecosystem: less concern**

**Solutions for management and conservation plant resource**

# DAYAK BIOLOGICAL CLASSIFICATION SYSTEM AND THE USE OF PARA-TAXONOMISTS IN THE INVENTORY OF TROPICAL FOREST TREES

**Theilade, I., Girmansyah, D., and Brofeldt, S.**
*IFRO, University of Copenhagen*

One of the functions of the newly-established Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is to bring different knowledge systems, including indigenous knowledge systems, to the science–policy interface. One key challenge lies in how to use information generated by different knowledge systems. It is therefore important to understand how folk biological classification systems connect or otherwise with scientific classification systems. However, in-depth studies on the principles underlying folk biological taxonomy and nomenclature in non-Western societies are still lacking. This lack of understanding of the conceptual foundations of 'ethnoscience' may partly explain the few attempts to bring indigenous knowledge systems into the science-policy interface.

The aim of the present study was to explore the Dayak biological classification system of rainforest trees and to compare tree identifications by a trained botanist to those of local indigenous forest users.

A network of 32 circular plots (r=15) was established in undisturbed rainforest in Berau, East Kalimantan. Trees (>10 cm DBH) within the plots were identified individually by an Indonesian botanists and by six indigenous Dayak men from the nearby village. The identifications by the Dayaks relied solely on existing local ecological knowledge using vernacular names. After the survey, the six Dayaks received training as para-taxonomists to autonomously collect botanical specimens. Focus group discussions using name cards were conducted to map the Dayak classification system of trees.

A total of 752 trees were found inside the plots representing 136 species. An additional 64 tree species were collected by the para-taxonomists outside the plots. The Dayak linguistically recognised groupings of trees (or taxa) of varying degree of inclusiveness, and grouped the taxa into hierarchical categories. Moreover, taxa assigned to each rank were mutually exclusive. Our results suggest that Dayak experts can reliably identify tree species without having access to identification guides and herbaria. Older men applied the classification system more consistently and in greater detail than the younger men. The local para-taxonomists were able to collect large volumes of tree diversity data at relatively low cost suggesting that indigenous knowledge and classification systems may support efforts by botanists to inventory tropical forest trees.

***Key words:*** *ethnoscience, folk taxonomy, biodiversity, tree diversity, indigenous knowledge, botanical collection, Borneo, Indonesia*

Hartoyo APP, Supriyanto, Siregar IZ, Theilade I, Prasetyo LB. 2017. **Agroforest diversity and ethnobotanical aspects in two villages of Berau, East Kalimantan, Indonesia**. Submitted on *Journal of Biological Diversity*.

The increasing loss of Indonesian primary forests has significant implications for climate change mitigation and biodiversity conservation efforts. An assessment is needed as a requirement for REDD+ implementation. REDD+ aims to reduce emissions from deforestation and forest degradation, conservation, enhancement of forest carbon stocks, and sustainable forest management (SFM). The objectives of this research were to characterize agroforest diversity with respect to tree structure and composition, and to determine ethnobotanical uses in agroforestry practices. Fieldwork was conducted in Kampung Birang and Kampung Merabu, Berau, East Kalimantan. This research focused on measuring trees which were classified into two size classes, namely medium trees (10≤dbh≤20 cm) and large trees (dbh>20 cm) due to the ability of both size classes to survive more than the other tree growth levels. Local community members were trained in plot establishment (60 plots, 50x50 m), trees diameter measurement, trees tagging, and herbarium collection. Local community members identified tree species by local names and listed the species uses. The agroforest stand structure reflected in relationship between diameter class and number of individuals in Kampung Birang and Kampung Merabu resulted in reversed J-curve. The total number of species and individuals recorded in Kampung Merabu were higher than in Kampung Birang. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. There was an indication of the human disturbances. *L. parasitum* (langsat) dominated at medium and large trees in Kampung Birang. *V. pinnata* (belangkan/leban) dominated at the medium tree, while *A. elasticus* (terap) dominated at large tree in Kampung Merabu. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. Forests in Kampung Birang and Kampung Merabu were not quite stable (H'= 1.1). There was an indication of the human disturbances. Dominance of species was not found both in Kampung Birang and Kampung Merabu. E value showed moderate evenness and high richness category. Most of the species which belonged to the top ten species with the highest importance value index were edible fruit trees. The other uses of forest are to produce herbal medicines, energy (firewood), materials of building construction, and forage.

***Keywords:*** *REDD+, biodiversity, ethnobotanical, agroforestry, Kalimantan*

## Introduction

Thank you Mr Chairman. I will talk about a study on Dayak classification of trees, and how training of local community members as para-taxonomists may aid cost-

effective inventory of tree diversity in East Kalimantan. It is an on-going effort but I would like to give some preliminary results.

IPBES was founded in 2012 and is placed under the auspices of four United Nations entities: UNEP, UNESCO, FAO and UNDP and administered by UNEP.

Biodiversity is facing a crisis and we are in the middle of the sixth mass extinction.

Less known is that the population of experienced field botanists is also on the decline as public funding has largely dried out in many countries.

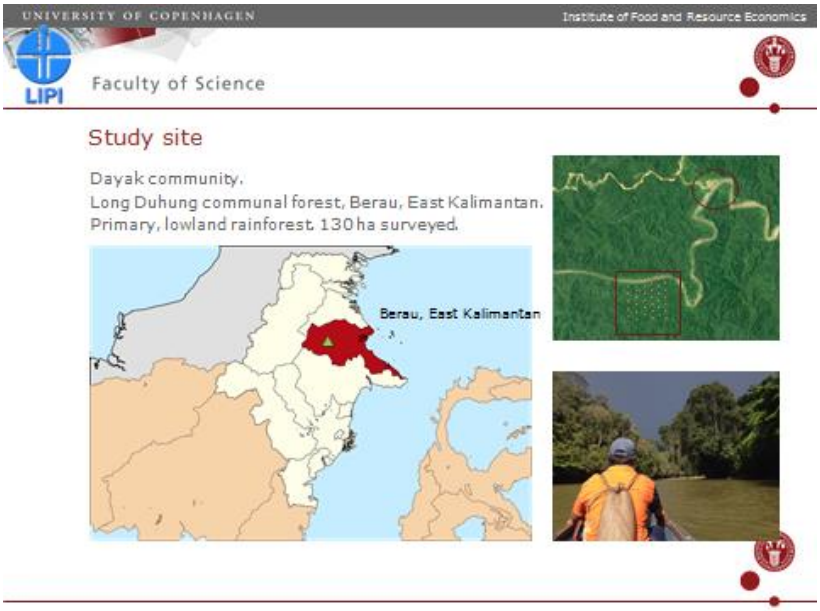
Earlier studies documented that indigenous folk taxonomy share a number of strikingly similar structural principles, which I listed here.

Faced with mega-diversity the tropics, researchers have long argued for the largely untapped potential of involving barefoot botanists or para-taxonomists. Why don't we blanket the tropics with para-taxonomists to speed up the flora work? However, there has also been resistance (also within the botanical community), which is eloquently described by Janzen in his paper from 2004. The consistency of vernacular names has been doubtful and curators fear that herbaria will be cluttered with useless material.

However, early studies by Berlin (1973, 1992) and co-workers found that folk biological classification systems share a number of strikingly similar structural principles. All languages seem to have recognised groupings of taxa. And all languages seem to group the taxa into hierarchical categories.

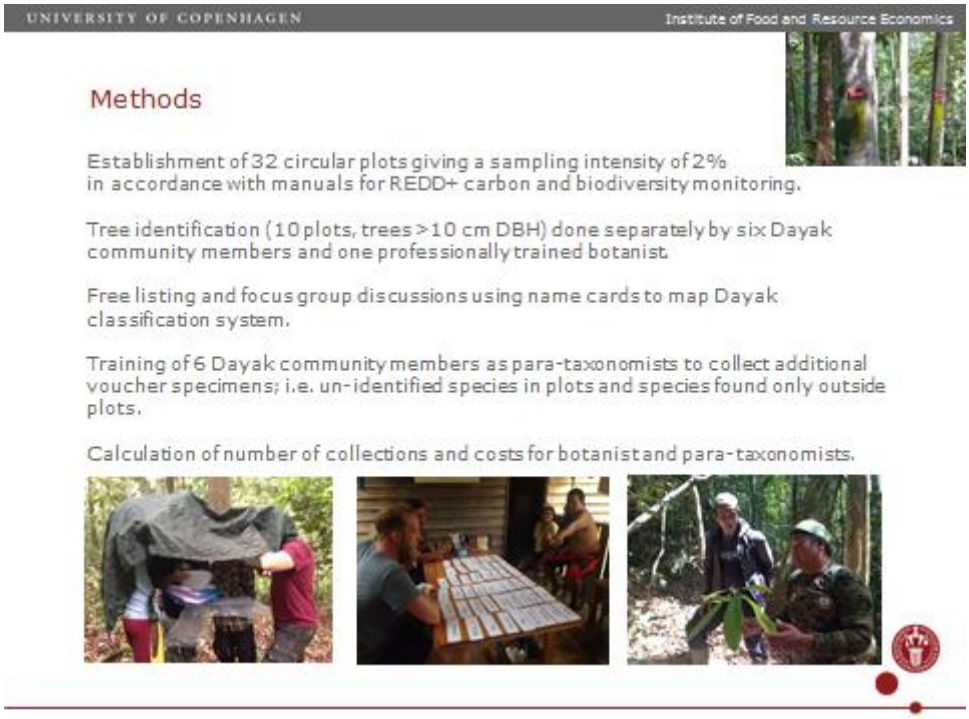
Holman (2002) found that taxa assigned to each rank are mutually exclusive, and folk biology taxa are about as inclusive as scientific genera.

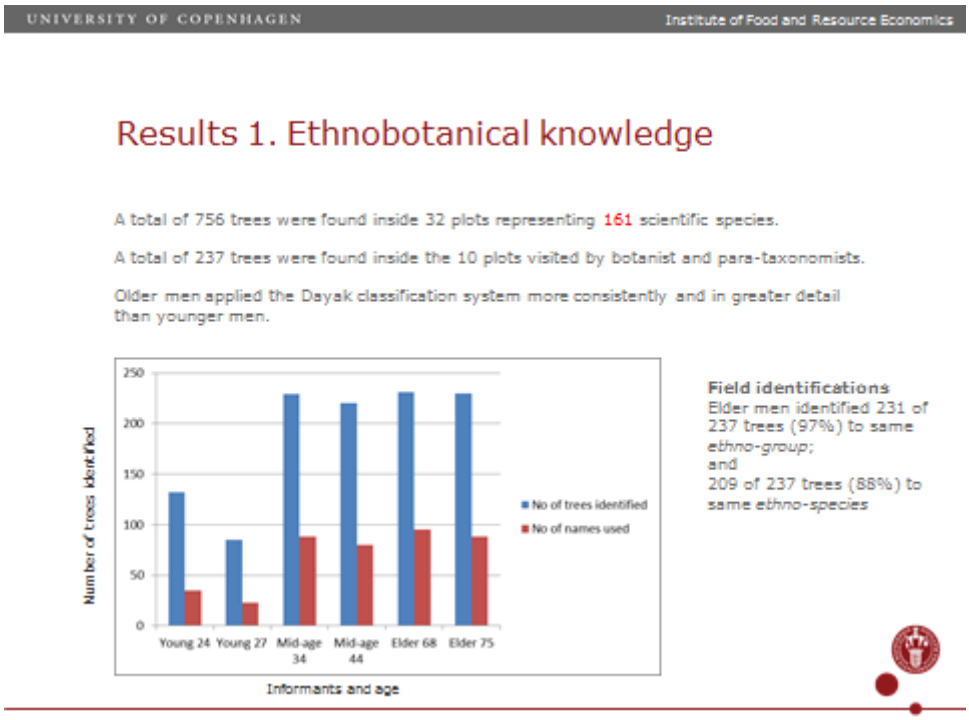
In-depth studies of the principles underlying folk biological taxonomy and nomenclature in non-Western societies are lacking.



Tried to mimic real-world REDD+ setting using manuals for best practice in monitoring carbon and biodiversity.

The professional botanist visited every three months to collect specimens and supervise the work.



**Results 1. Ethnobotanical knowledge**

Number of identified species increase over time (from 136 to 161) as herbarium work progresses.

We see the expected pattern that elder community members identified more trees and used more local names.

Local knowledge precise to group level. Less precise on species level. But still considered useful in scientific identification.

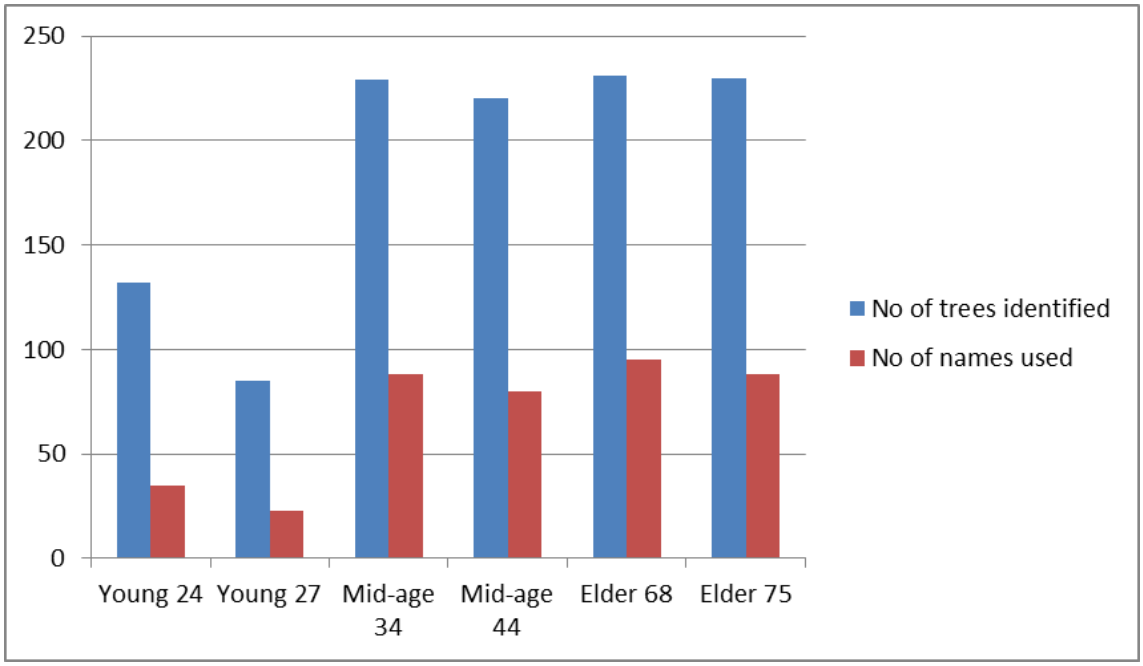
Difficult species are typically not useful to locals, light wood, rare species, and similar species within groups.

We assume that the professional botanist as yard-stick. It could be errors in scientific ID, or data entry.

A total of 756 trees were found inside 32 plots representing 161 scientific species.

A total of 237 trees were found inside the 10 plots visited by botanist and para-taxonomists.

Older men applied the Dayak classification system more consistently and in greater detail than younger men.



# Results 2. Dayak classification system

Number of ethnospecies mentioned in free-listing and pile & sort exercise: 237

The Dayak linguistically recognised 42 groups of tree species (taxa) equivalent to scientific plant families or genera.

Taxa assigned to each rank were mutually exclusive.

| Dayak Group name (no sp.) | Scientific identification |
|---|---|
| Bokai (2) | Blumeodendron |
| Bolkan (2) | Canthium |
| Bnyiu (8) | Aglaia |
| Dol Hong (3) | Symplocos |
| Dol Oh (2) | Calophyllum |
| Ella' (4) | Macaranga |
| Ellap (4) | Glochidion/Naucica |
| Ewang (17) | Dipterocarpaceae |
| Gu Yiu (8) | Garcinia |
| Guling (6) | Licania |
| Howuh (8) | Syzygium |
| Kolmau (6) | Canyodes |
| Kjau Dong 2) | Diospyros |
| Klal (11) | Fagaceae |
| Kaai (2) | Allophylus/Pometia |
| Lang Elung (2) | Dillenia |
| Layck (2) | Violaceae |
| Loh Jin 6) | Dunio |
| Lopso Bwau 2) | Baccaurea |
| Mea' (2) | Aporosa |
| Mhap (2) | Archidendron/Licania |
| Mut (4) | Artocarpus |
| Klal (10) | Fagaceae |
| Tlus (6) | Lauraceae |



# Results 3. Para-taxonomists

Para-taxonomists collected an additional 16 species inside plots and 90 species outside the plots over 1.5 years. Increased species richness by 50%.

Number of ethnospecies identified in the forest to date: 182 of 237 free-listed.

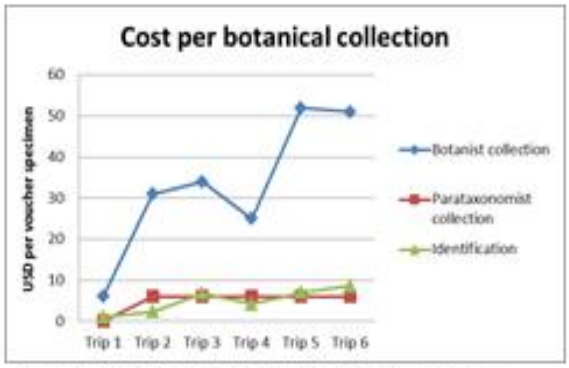
Para-taxonomists collected high-quality voucher specimens of previously un-documented tree species. All para-taxonomist collections were fertile.

Para-taxonomist labels contain: date, location, coordinates, collection no., collectors name, description of tree, local name.

## Results 4. - Costs per botanical collection

| | Trip 1 | Trip 2 | Trip 3 | Trip 4 | Trip 5 | Trip 6 | Trip 7 |
|---|---|---|---|---|---|---|---|
| Botanist collections (no.) | 701 | 64 | 84 | 96 | 48 | 59 | ? |
| Parataxonomist collections (no.) | 0 | 25 | 55 | 0 | 25 | 21 | 40 |

Botanist collected sterile and fertile material
Para-taxonomists collected fertile material only




Botanist expenses mainly outside community
Para-taxonomist expenses within community

Training of para-taxonomists was done during Trip 1

**Discussion and conclusion**

The Dayak has a hierarchical classification system for the tree flora. Taxa assigned to each rank are mutually exclusive, and folk biology taxa are about as inclusive as scientific genera or less often scientific families.

Key informants applied local names consistently and local names can be related to scientific names.

Younger informants knew less species than elder informants indicating that erosion of knowledge may take place.

Dayak para-taxonomists were capable and cost-effective collectors of quality voucher specimens.

Documented tree species richness increased by 50% by training and employing local para-taxonomists.

Motivation and trust was essential. Time constraints (patrols to stop illegal logging) and doubt about payments were main barriers for the para-taxonomists.

## Next Activities

- Build mini Herbarium " Herbarium Duhungense"
- Setting new conventional dryer using gas stove
- Make references collections and deposit at Long duhung Herbarium
- Prepare for Longduhung tree guide Book and draft of paper.





| | |
|---|---|
| Family name:<br>Species name:<br>First publication<br>Description:<br><br><br>Location:<br>Local name:<br>Uses: | Illustrating |



## Terima kasih Long Duhung

## AGROFOREST DIVERSITY AND ETHNOBOTANICAL ASPECTS IN TWO VILLAGES OF BERAU, EAST KALIMANTAN, INDONESIA

**Hartoyo APP, Supriyanto, Siregar IZ, Theilade I, Prasetyo LB. 2017.**
*Submitted on Journal of Biological Diversity.*

The increasing loss of Indonesian primary forests has significant implications for climate change mitigation and biodiversity conservation efforts. An assessment is needed as a requirement for REDD+ implementation. REDD+ aims to reduce emissions from deforestation and forest degradation, conservation, enhancement of forest carbon stocks, and sustainable forest management (SFM). The objectives of this research were to characterize agroforest diversity with respect to tree structure and composition, and to determine ethnobotanical uses in agroforestry practices. Fieldwork was conducted in Kampung Birang and Kampung Merabu, Berau, East Kalimantan. This research focused on measuring trees which were classified into two size classes, namely medium trees (10≤dbh≤20 cm) and large trees (dbh>20 cm) due to the ability of both size classes to survive more than the other tree growth levels. Local community members were trained in plot establishment (60 plots, 50x50 m), trees diameter measurement, trees tagging, and herbarium collection. Local community members identified tree species by local names and listed the species uses. The agroforest stand structure reflected in relationship between diameter class and number of individuals in Kampung Birang and Kampung Merabu resulted in reversed J-curve. The total number of species and individuals recorded in Kampung Merabu were higher than in Kampung Birang. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. There was an indication of the human disturbances. *L. parasitum* (langsat) dominated at medium and large trees in Kampung Birang. *V. pinnata* (belangkan/leban) dominated at the medium tree, while *A. elasticus* (terap) dominated at large tree in Kampung Merabu. Kampung Merabu was more diverse than in Kampung Birang, although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu. Forests in Kampung Birang and Kampung Merabu were not quite stable (H'= 1.1). There was an indication of the human disturbances. Dominance of species was not found both in Kampung Birang and Kampung Merabu. E value showed moderate evenness and high richness category. Most of the species which belonged to the top ten species with the highest importance value index were edible fruit trees. The other uses of forest are to produce herbal medicines, energy (firewood), materials of building construction, and forage.

***Keywords:*** *REDD+, biodiversity, ethnobotanical, agroforestry, Kalimantan*

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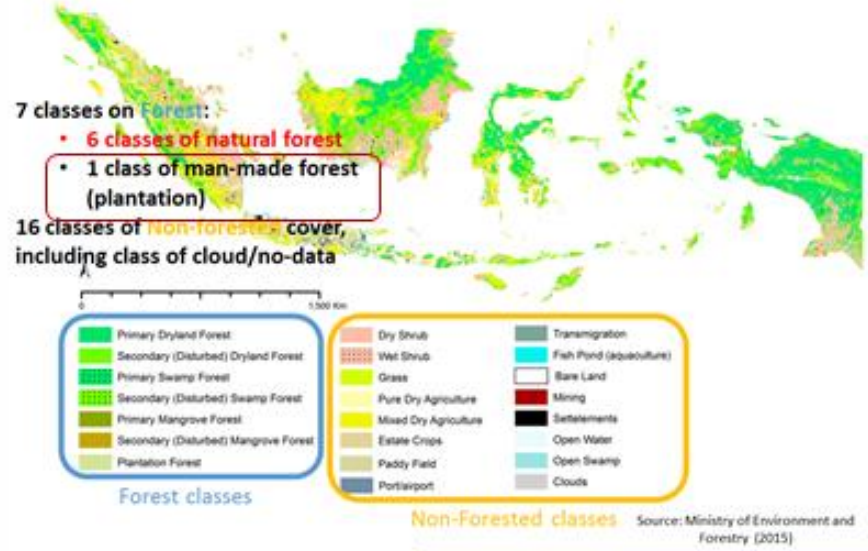
# AGROFOREST DIVERSITY AND ETHNOBOTANICAL ASPECTS IN TWO VILLAGES OF BERAU, EAST KALIMANTAN, INDONESIA

**Adisti Permatasari Putri Hartoyo**, Supriyanto, Iskandar Z. Siregar, Ida Theilade, Lilik B. Prasetyo

*(Hanoi, 16 November 2017)*

## BACKGROUND | National Forest Monitoring System

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## BACKGROUND | Problem Analysis

REDD+

(Reduce emissions, conservation, enhancement of forest carbon stocks, and **sustainable forest management**)

**AGROFORESTRY**

- ☐ Baseline information is still lacking
- ☐ Required the appropriate strategies locally in conservation and sustainable utilization

**Ecosystem function**

- **Production**, **Regulation**, Habitat, **Information**

- ☐ Total Indonesian primary forest loss was over 6.02 Mha from 2000 to 2012 (Margono *et al*. 2014)



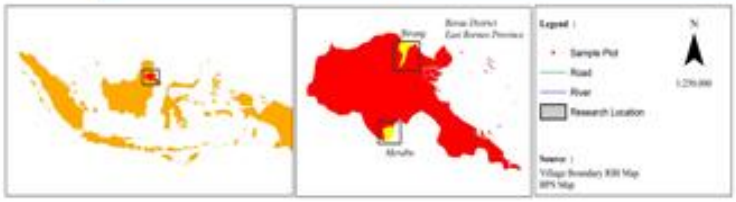
## BACKGROUND | The Objectives

To characterize agroforest diversity with respect to tree structure and composition

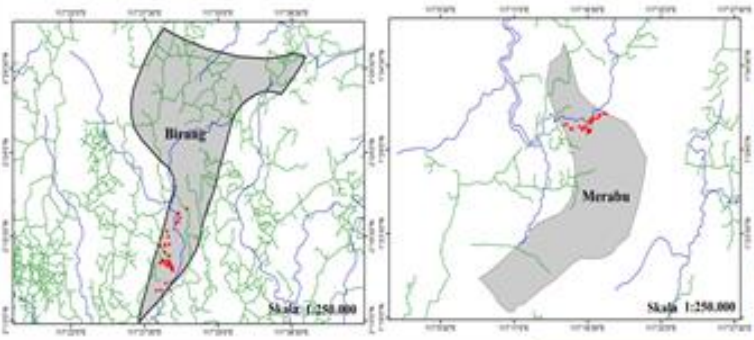
To determine ethnobotanical uses in agroforestry practices

# METHODS

## Study Sites



Kampung Birang




Kampung Merabu

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# METHODS

## Study Sites in Kampung Birang

- The distance of Kampung Birang to nearest main city Berau is 11 km. Kampung Birang is the largest village in the Gunung Tabur sub-District with a total area of 302 km$^2$.
- The main livelihoods in the village is farming, gardening, labour in the mining industry, fishing, business, and government staff.
- In addition, the community usually looks for valuable *gaharu* or agarwood, and hunt for wild animals in the forests.
- The majority of Kampung Birang community has forest gardens from their forefather along the edge of the Kampung Birang river.

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# METHODS

Study Sites in Kampung Merabu

- The distance of this sub-District to Berau is about 300 km. This village has a total area of 221 km2
- The limestone caves are a source of livelihoods for young men in this village who generate income as cave climbers and bird nest harvesters.
- The local communities in Kampung Merabu has forest gardens called *umaq*.
- These were established by their fore-fathers

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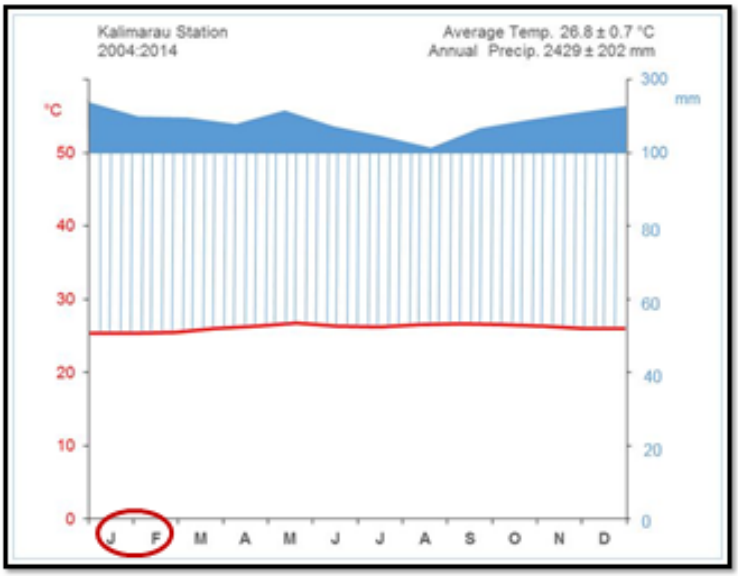
# Biophisical Aspect

Temperature & rainfall




**Average monthly temperature and rainfall at Kalimarau Airport, Berau (2004-2014). Raw data was analyzed from the Meteorology and Climatology Agency of Kalimarau, East Kalimantan (2016)**

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# Biophisical Aspect | Soil Analysis

| No. | Locations | Deep | Bulk Density | Total of pore space | The water content at pF | | | | Drainage pore | | Water available | Permeability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1.00 | 2.00 | 2.54 | 4.20 | Fast | Slow | | |
| | | (cm) | g/cc | % (Volume) | % (Volume) | | | | (%Vol) | | % | cm/hour |
| 1 | KB6 | - | 0.98 | 63.02 | 62.07 | 60.67 | 58.20 | 43.46 | 2.35 | 4.47 | 12.74 | 16.35 |
| 2 | KB10 | - | 1.41 | 46.79 | 46.26 | 45.86 | 40.13 | 24.97 | 0.93 | 5.73 | 15.16 | 1.08 |
| 3 | KB17 | - | 1.19 | 55.09 | 53.17 | 52.92 | 48.55 | 38.13 | 2.17 | 4.37 | 10.42 | 12.43 |
| | **Average** | - | **1.19** | **54.97 (m)** | **53.83** | **53.15** | **48.29** | **35.52** | **1.82** | **4.86** | **12.77** | **9.95 (rf)** |
| 4 | KM 5 | - | 1.37 | 48.30 | 47.83 | 47.44 | 41.88 | 33.25 | 0.88 | 5.56 | 8.63 | 0.72 |
| 5 | KM 21 | - | 1.26 | 52.45 | 51.11 | 50.41 | 47.03 | 35.48 | 2.04 | 3.38 | 11.55 | 8.45 |
| 6 | KM 29 | - | 1.29 | 51.32 | 50.35 | 48.78 | 45.09 | 34.66 | 2.54 | 3.69 | 10.43 | 11.12 |
| | **Average** | - | **1.31** | **50.69 (m)** | **49.76** | **48.88** | **44.67** | **34.46** | **1.81** | **4.21** | **10.20** | **6.75 (rf)** |

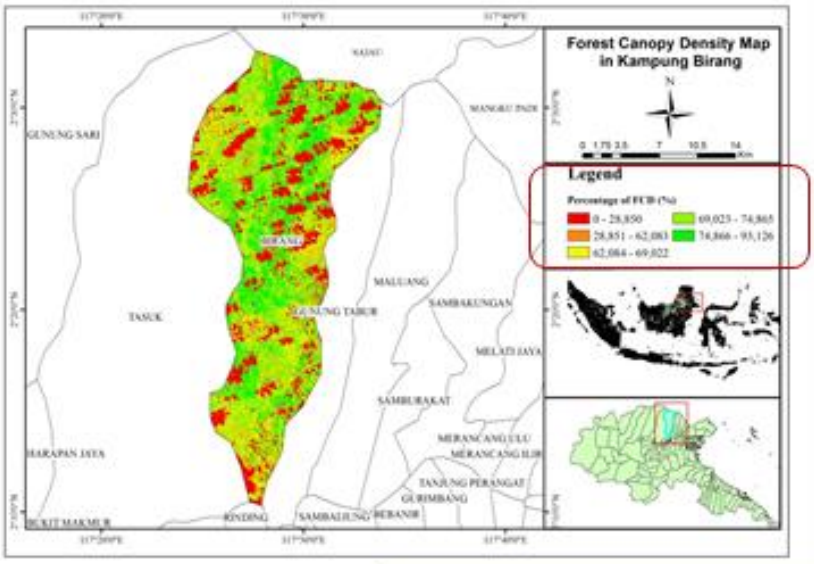
Source: Hardjowigeno (1993)
Remarks: m = moderate
rf = rather fast

| No. | Locations | *pH (1 : 1) SNI 03-6787-2002 | | *C Org SNI 13-4720-1998 (Walkey & Black) | *N Total SNI 13-4721-1998 (Kjeldahl) | C/N Ratio | *$P_2O_5$ tersedia SL-MU-TT-05 (Bray I/II) | Exchangable kation and kation exchange capacity (SL-MU-TT-07 c (Ekstrak Penyangga $NH_4OAc$ 1,0 N pH 7,0) | | | | | | Base saturation | $Al\text{-}H_{Ex}$ SL-MU-TT-09 (Ekstrak KCl 1N) | | Texture SL-MU-TT-10 (Pipet) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $H_2O$ | $CaCl_2$ | | | | | *Ca | *Mg | *K | *Na | Total | KTK | | $Al^{3+}$ | $H^+$ | Sand (50μ - 2mm) | Silt (2μ - 50μ) | Clay (0.2μ - 2μ) |
| | | | | % | % | | ppm | cmol/kg | | | | | | % | me/100g | me/100g | % | % | % |
| 1 | KB6 | 6.1 | 5.9 | 2.81 | 0.36 | 8 | 14.0 | 1.10 | 4.32 | 1.01 | 0.18 | 6.79 | 25.26 | 26.87 | 0.00 | 0.23 | 15.8 | 45.0 | 39.4 |
| 2 | KB10 | 5.6 | 5.2 | 3.57 | 0.47 | 8 | 19.2 | 17.21 | 7.05 | 1.74 | 0.24 | 26.24 | 32.66 | 80.34 | 0.00 | 0.15 | 6.1 | 41.3 | 52.6 |
| 3 | KB17 | 4.3 | 3.9 | 2.84 | 0.35 | 8 | 15.7 | 2.02 | 2.17 | 1.30 | 0.22 | 5.71 | 25.56 | 22.34 | 9.65 | 0.93 | 22.2 | 39.0 | 38.8 |
| | **Average** | **5.33 (a)** | **5.00** | **3.07 (h)** | **0.39 (m)** | **8 (l)** | **16.30 (vh)** | **6.78** | **4.58** | **1.35** | **0.21** | **12.91** | **27.83 (h)** | **43.18** | **3.22** | **0.44** | **14.63** | **41.77** | **43.60** |
| 4 | KM 5 | 5.5 | 4.8 | 2.15 | 0.26 | 8 | 5.7 | 10.93 | 5.34 | 0.66 | 0.21 | 17.13 | 20.88 | 82.02 | 0.00 | 0.39 | 4.7 | 37.1 | 58.2 |
| 5 | KM 21 | 5.1 | 4.2 | 1.30 | 0.16 | 8 | 6.7 | 1.10 | 1.15 | 0.52 | 0.15 | 2.92 | 7.68 | 38.08 | 1.88 | 0.07 | 34.6 | 32.6 | 30.8 |
| 6 | KM 29 | 5.6 | 5.0 | 1.05 | 0.14 | 8 | 12.1 | 2.80 | 1.16 | 0.16 | 0.13 | 4.25 | 7.25 | 58.75 | 0.00 | 0.20 | 37.0 | 28.3 | 34.7 |
| | **Average** | **5.40 (a)** | **4.67** | **1.50 (vl)** | **0.19 (l)** | **8 (l)** | **8.17 (m)** | **4.94** | **2.55** | **0.45** | **0.16** | **8.10** | **11.93 (l)** | **59.62** | **0.63** | **0.22** | **26.10** | **32.67** | **41.23** |

Source: Hardjowigeno (1993)
Remarks: a = acid m = moderate
h = high l = low
vl= very low vf = very high



# Agroforest Diversity and Ethnobotanical | Plot Selection



## Agroforest Diversity and Ethnobotanical

Participatory approach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## Agroforest Diversity and Ethnobotanical

Training to the local community

- Plot establishment
- Measurement of diameter (Medium & large trees)
- Tree tagging
- Soil sampling
- Measurement of canopy profile

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## Agroforest Diversity and Ethnobotanical

Training to the local community

- Total of plots were 30 plots each village
- Plot size 50x50m

## Agroforest Diversity and Ethnobotanical

Soil Sampling

Disturbed soil sampling

Undisturbed soil sampling

# Agroforest Diversity and Ethnobotanical

Biodiversity Assessment

- **Misra (1980) explained the way to calculate IVI, as follows:**

| | | |
|---|---|---|
| Density (D) | = | Total number of individuals / Total number of quadrats studied |
| Relative Density (RD) | = | Number of individuals of the species X 100 / Number of individuals of all species |
| Frequency | = | Number of quadrats in which species occured / Total number of quadrat studied |
| Relative frequency (RF) | = | Number of occurrence of the species X 100 / Number of occurence of all species |
| Dominance | = | Total number of individuals of the species / Total number of quadrats of occurence |
| Relative dominance (RDo) | = | Total basal area of the species X 100 / Total basal area of all species |

- **IVI (medium & large tree) = RD + RF + RDo**

❑ **Index of Diversity (H')**

$$H' = -\sum_i Pi \ln(Pi)$$

❑ **Index of Evennes (E)**

$$E = \left(\frac{H'}{\ln S}\right)$$

❑ **Index of Dominancy (C)**

$$C = \sum_{i=1}^{n} \left(\frac{ni}{N}\right)^2$$

❑ **Index of Margalef (Dmg)**

$$D_{mg} = \left(\frac{S-1}{Ln\ (N)}\right)$$

Magurran (1988)



# Agroforest Diversity and Ethnobotanical

Tree Species Characteristics and Uses

Based on the characteristic of trees to grow under the shading:

- shade tolerant
- semi-tolerant
- shade intolerant species

Field observation ↔ Interview ↔ Useful Tropical Plants & Plant List

# Agroforest Diversity and Ethnobotanical

Results & Discussion

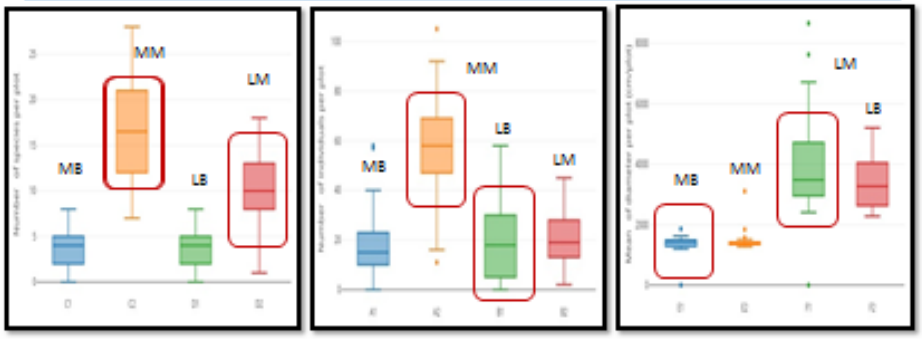


**Figure : The number of species per plot (a), The number of individuals per plot (b), mean of diameter per plot (c) (MB= medium trees in Kampung Birang; MM= medium trees in kampung Merabu; LB= large trees in Kampung Birang; LM= large trees in Kampung Merabu)**

- Kampung Birang: lower TI&TS → maintain specific species
- Kampung merabu: higher TS & TI → no maintain (close to nature)



# Agroforest Diversity and Ethnobotanical

Results & Discussion

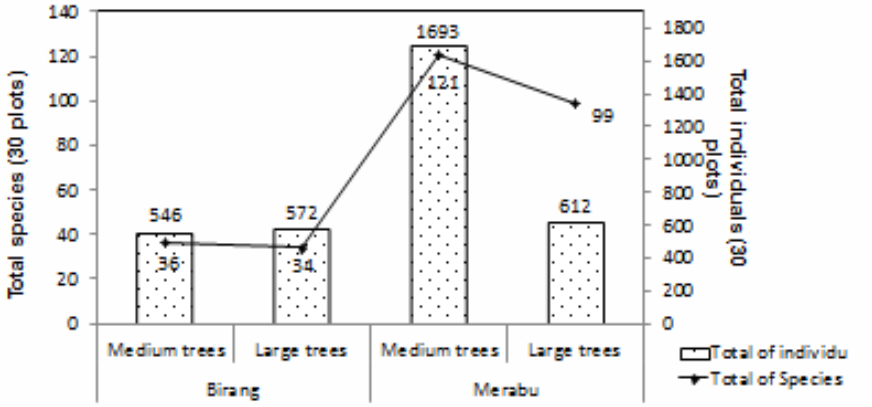


**Figure : Total of individuals and species at the medium and large tree classes in the Kampung Birang and Merabu**

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# Agroforest Diversity and Ethnobotanical

Results & Discussion

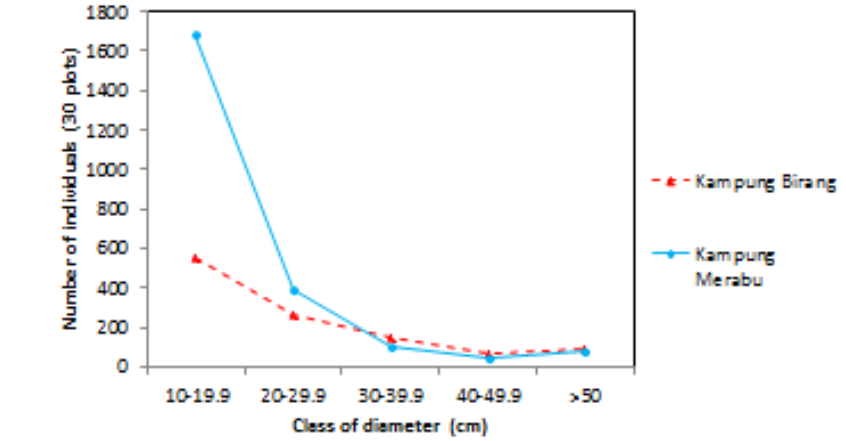


**Figure : The relationship between class diameter and number of individuals in the Kampung Birang and Kampung Merabu**



# Agroforest Diversity and Ethnobotanical

Results & Discussion

**Top ten species with largest importance value index of medium trees both in Kampung Birang and Kampung**

| No. | Species (in scientific name) | Species (in local name) | Kampung Birang | | | | Kampung Merabu | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | RD (%) | RF (%) | Rdo (%) | IVI (%) | RD (%) | RF (%) | Rdo (%) | IVI (%) |
| 1 | *Lansium parasitum* (Osbeck) K.C. Sahni & Bennet | Langsat | 46 | 19 | 47 | 112 | 2 | 3 | 2 | 7 |
| 2 | *Nephelium lappaceum* L. | Rambutan | 18 | 11 | 14 | 42 | 14 | 4 | 14 | 32 |
| 3 | *Durio zibethinus* L. | Durian | 5 | 10 | 5 | 19 | - | - | - | - |
| 4 | *Anthocephalus cadamba* (Roxb.) Miq. | Kulimpayan | 6 | 3 | 7 | 15 | - | - | - | - |
| 5 | *Parkia speciosa* Hassk | Petai | 3 | 5 | 4 | 13 | - | - | - | - |
| 6 | *Sandoricum koetjape* (Burm .f.) Merr. | Simangar | 2 | 4 | 2 | 8 | - | - | - | - |
| 7 | *Artocarpus integer* (Thunb.) Merr. | Cempedak | 2 | 4 | 2 | 8 | - | - | - | - |
| 8 | *Tectona grandis* Linn. F. | Jati | 2 | 2 | 3 | 7 | - | - | - | - |
| 9 | *Syzygium malaccense* (L.) Merr. & L.M. Perry | Jambu lokal | 1 | 4 | 2 | 7 | - | - | - | - |
| 10 | *Mangifera indica* L. | Ampelam/ Mempalan/Mangga | 1 | 5 | 1 | 6 | 3 | 3 | 3 | 9 |
| 11 | *Vitex pinnata* L. | Belangkan/Leban | - | - | - | - | 17 | 4 | 16 | 36 |
| 12 | *Theobroma cacao* L. | Kakao | - | - | - | - | 11 | 2 | 10 | 23 |
| 13 | *Artocarpus heterophyllus* Lamk. | Jackfruit | - | - | - | - | 3 | 3 | 4 | 11 |
| 14 | *Glochidion rubrum* Blume | Berenai | - | - | - | - | 3 | 3 | 4 | 10 |
| 15 | *Ficus septica* Burm.f. | Berbocom | - | - | - | - | 3 | 3 | 3 | 9 |
| 16 | *Mallotus mollissimus* (Geiseler) Airy Shaw | Binang | - | - | - | - | 3 | 2 | 3 | 8 |
| 17 | *Willughbeia coriacea* Wall. | Karet | - | - | - | - | 4 | 0 | 4 | 8 |

# Agroforest Diversity and Ethnobotanical

Results & Discussion

Table : Top ten species with largest importance value index of large trees both in Kampung Birang and Kampung Merabu

| No | Species (in scientific name) | Species (in local name) | Kampung Birang | | | | Kampung Merabu | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | RD (%) | RF (%) | Rdo (%) | IVI (%) | RD (%) | RF (%) | Rdo (%) | IVI (%) |
| 1 | *Lansium parasitum* (Osbeck) K.C. Sahni & Bennet | Langsat | 53 | 20 | 29 | 102 | - | - | - | - |
| 2 | *Durio zibethinus* L. | Durian | 11 | 18 | 16 | 45 | - | - | - | - |
| 3 | *Tectona grandis* Linn. F. | Jati | 9 | 2 | 4 | 15 | - | - | - | - |
| 4 | *Durio kutejensis* (Hassk.) Becc. | Elai/ Kelay | 11 | 18 | 16 | 14 | - | - | - | - |
| 5 | *Nephelium lappaceum* L. | Rambutan | 2 | 4 | 6 | 13 | 12 | 6 | 4 | 21 |
| 6 | *Durio dulcis* Becc. | Lahung | 1 | 3 | 7 | 12 | - | - | - | - |
| 7 | *Vitex pinnata* L. | Laban | 4 | 3 | 4 | 11 | 10 | 5 | 6 | 21 |
| 8 | *Ceiba pentandra* (L.) Gaertn. | Kapuk/Randu | 1 | 3 | 7 | 10 | - | - | - | - |
| 9 | *Artocarpus heterophyllus* Lamk. | Jackfruit | 1 | 6 | 1 | 8 | 6 | 4 | 4 | 13 |
| 10 | *Lansium domesticum* Correa | Duku | 0 | 1 | 6 | 8 | - | - | - | - |
| 11 | *Artocarpus elasticus* Reinw. Ex Blume | Terap | - | - | - | - | 3 | 5 | 18 | 26 |
| 12 | *Kleinhovia hospita* L. | Temangar | - | - | - | - | 9 | 2 | 10 | 21 |
| 13 | *Octomeles sumatrana* Miq. | Benuang/Binuang | - | - | - | - | 4 | 1 | 11 | 16 |
| 14 | *Mangifera indica* L. | Mempalan/Mangga | - | - | - | - | 5 | 5 | 4 | 14 |
| 15 | *Litsea costalis var.nidularis* (Gamble) Ng | Mall | - | - | - | - | 4 | 2 | 4 | 9 |
| 16 | *Dimocarpus longan* Lour. | Dupar/mata kucing | - | - | - | - | 3 | 3 | 2 | 8 |
| 17 | *Lannea coromandelica* (Houtt.) | Alaran | - | - | - | - | 2 | 3 | 3 | 8 |

# Agroforest Diversity and Ethnobotanical

Results & Discussion

Table : Biodiversity index of medium and large trees both in Kampung Birang and Kampung Merabu

| No | The level of tree growth | Kampung Birang | | | | Kampung Merabu | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | H' | C | E | $D_{mg}$ | H' | C | E | $D_{mg}$ |
| 1 | Medium trees | 1.1 | 0.2 | 0.3 | 5.6 | 1.7 | 0.04 | 0.4 | 16.1 |
| 2 | Large trees | 1.1 | 0.2 | 0.3 | 5.2 | 1.7 | 0.04 | 0.4 | 15.3 |

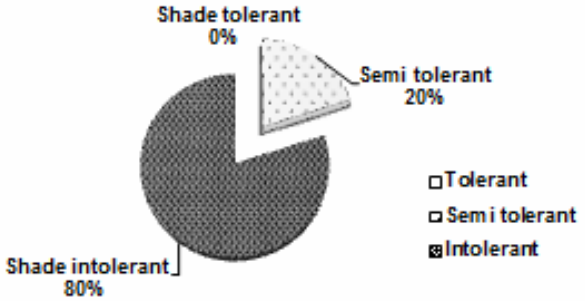


Figure : Percentage of Species characteristics in Agroforestry practices

# CONCLUSION

- The agroforest stand structure reflected → reverse J-curve.
- The total number of species and individuals recorded in Kampung Merabu were higher than in Kampung Birang.
- Although based on soil quality analysis in Kampung Birang was better than in Kampung Merabu.
- There was an indication of the human disturbances & different management.
- Most species found: *L. parasitum* (langsat), *V. pinnata* (belangkan/leban), *A. elasticus* (terap)



- Most of the species which belonged to the top ten species with the highest importance value index were edible fruit trees.



# CONCLUSION

- Forests in Kampung Birang and Kampung Merabu were not quite stable (H' = 1.1).
- Dominance of species was not found; high richness category
- The top ten tree species with the largest importance value index (IVI) across both villages were 80% shade intolerant species and 20% semi-tolerant species

## SUGGESTIONS

- It needs to assess the temporal & spatial on ecological and socio-economic dynamics, then analysis the direct and indirect ecosystem responses.
- It also needs to observe human management and disturbances to the forest ecosystem due to the relation of ecosytem dynamic and human intervention.

## IMPLICATION

- Low H' → high species richness → silviculture treatment
- Kampung Birang : enrichment planting, vegetative reproduction
- Kampung Merabu: enrichment planting, thinning

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